THE BRICKBUILDER.

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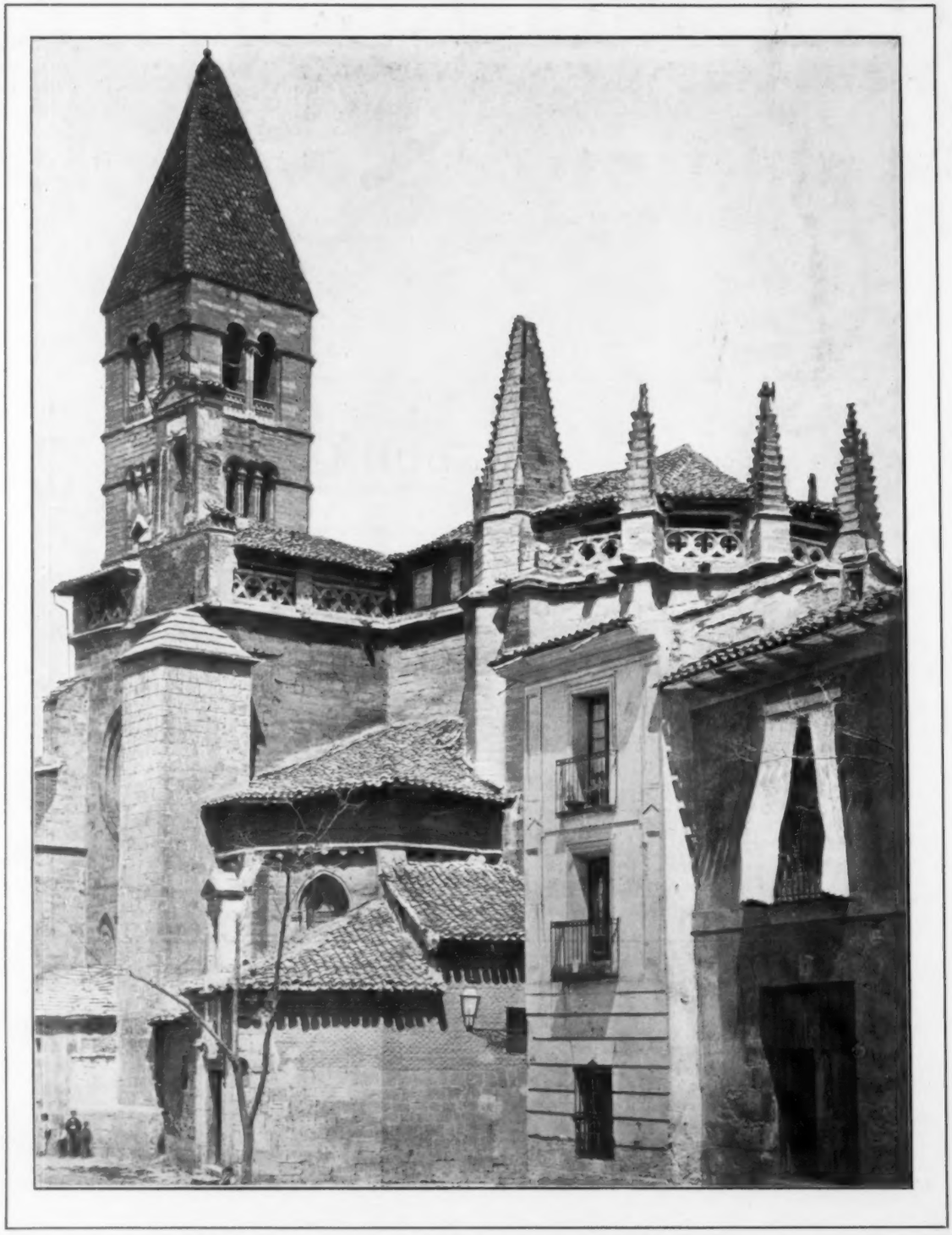

PARISH CHURCH OF LA ANTIGUA, VALLADOLID, SPAIN.

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THE BRICKBVILDER

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ARCHITECTURAL EXHIBITIONS.

THE Architectural League of America includes in its membership the leading architectural clubs of the country. Each year the League has been instrumental in organizing a series of exhibitions of architectural drawings. These exhibitions have reached and gladdened the hearts of many architects whose opportunities are restricted and who welcome every chance to see what their more fortunate brethren are accomplishing in the larger cities. But each year the League exhibitions have failed to reach the public or to interest to any considerable extent those outside of the profession of architecture. It is not enough, in our opinion, that drawings should be made and hung in these exhibitions for the mere purpose of calling together members of the profession for a discussion of the merits of the different designs exhibited. A close study of the important work which has been done in a large city during the year is undoubtedly of interest and value to the architects of that locality, but it is not enough, and if the Architectural League of America will at its next convention devote a portion of its time to a serious consideration of public exhibits it ought to be possible to evolve some method of operations by which a service can be rendered to the public, while at the same time the exhibitions would be of greatly enhanced value to the architects themselves. We would have the character of these exhibitions changed very materially, so that they would be attractive to laymen and would have both interest and educational value for those who either build houses for themselves or are associated in the construction of buildings for business purposes. It is a well-known fact that the average layman has very little knowledge of what constitutes good architecture, but it is this class which is usually called upon to act as building committees for churches and other buildings of semi-public nature, and if our exhibitions can be of such character as to interest the average layman, there would be little difficulty in getting a large attendance from this class. It can not be hoped that the merchant or man of affairs will in any great measure improve his mind by studying books on architecture, and we are not arguing that he shall be educated sufficiently to dominate the work of the architect, but rather that he shall have set before him the kind of selection of good works of architecture which can appeal to his reason and help him to discriminate between good and poor design, between fitness and unfitness. The larger education of the average citizen will of course come from the perpetual reminder afforded by good works of architecture actually constructed, but in even the best of our cities the good is often hopelessly mingled with the bad, and we must therefore depend upon the architectural exhibitions to set the standard in such way that it can not be misunderstood. The conduct of these exhibitions is a duty which the profession owes to the public.

The trouble with the most of our exhibitions is that they are generally resolved into mutual admiration or slaughtering societies, and the great public which pays the bills and which really wants good architecture seldom seeks for it in the architectural clubs. But to accomplish a reform in this respect, or rather to start a new movement, it is necessary that the architectural societies should take the initiative and should make of these annual exhibitions something in which the public will have an interest and present it in a manner which will make it attractive to all. Possibly one of the first steps might be to admit to the managing committees some shrewd business men who would look at the thing from the public standpoint. The exhibitions of the Copley Society, in Boston, have been markedly successful, and some one has been unkind enough to suggest that a possible reason for this success is the fact that no painter or artist has the management. They interest the public in just the way our architectural exhibitions might and ought to attract general attention, and certainly the desired end would not be accomplished by holding the exhibitions remote from the beaten paths of the community, by charging admissions except to a favored few, or by treating the exhibition as a matter of purely professional moment in which the public has no part.

We may argue for a new style and new forms or for an old style and old forms in our architecture, but we can not hope to create an architecture which shall fairly represent the average intelligence of the American people until the public has a better conception of the fundamental principles upon which good architecture is created.

The Hospital "Unit."

BY GEORGE H. M. ROWE, M.D., MEDICAL SUPERINTENDENT, THE BOSTON CITY HOSPITAL.

THE motto of a famous scientist was. "Prove and prove again." This might well be the guiding idea of the hospital expert. Only long extended tests can vindicate what is best, either in method or result. The laboratory rule of "Observe, record, collate, conclude," applies to hospital construction as it does to most other lines of investigation.

The progress since the Civil War in building hospitals has given great impetus to broadening some of the general principles of their construction. Formerly they were not so often or so well constructed, because there were fewer standards. Medical science grew slowly, and naturally hospitals had a parallel development. Since the advent of aseptic surgery new principles have been evolved, revolutionizing old tenets and throwing new light upon the fundamental laws of construction. Even in my own time I have seen these principles pass through three stages: first, a "heap of buildings" full of ornamentation, with extension of surface in every conceivable form, both outside and inside the walls; second, the assumption that a building for sick people must necessarily become so choked and impregnated with disease germs as to be surgically unclean and hence unfit for safe occupancy, and that inexpensive one-storied buildings should be erected, these to be destroyed and renewed every ten or twelve years. But the advent of aseptic surgery soon taught us that it was not the germs lodged in a building that brought disaster, but the want of surgical cleanliness in all the persons and things that had to do with the patient. This aseptic surgical period brought a departure from the one-story building to those with several stories; but, recognizing new hospital principles, they combined every feature ingenuity could suggest for the cleanliness of buildings, as well as the absolute cleanliness of persons, instruments, beds, linen and utensils. This new point of view, together with the extended uses of steam, with electricity which permitted power to be transmitted where previously steam was impracticable, combined with new and well adapted building materials in the surgical sense, gradually evolved a better type which is now accepted as the present standard. The general arrangement of a hospital group, the various ends to be attained for the different kinds of work, have become better understood. It is now clearly appreciated that hospitals, like other architectural specialties, are a distinct class by themselves, and require a specific treatment quite different from other buildings.

In the previous articles that have appeared in THE BRICKBUILDER certain general principles of hospital construction have been ably set forth, and I do not intend to rehearse what has been so well said. I shall attempt briefly to elaborate some of the fundamental needs of construction and to deduct from my own hospital experience some conclusions, the result of a somewhat extended hospital service.

I take it for granted that the pavilion system is now conceded to be the best type of hospital economy, and my suggestions apply to a hospital, say, of 250 to 500 or more beds. As a numeral represents the definite number of units that compose it, so a hospital is a composite of the wards it contains. By the word "unit" is implied the large room or ward of standard size devoted to one class or sex of patients treated in one group, with the necessary accessories for the proper treatment of that group.

A hospital of any class or size, to be successful in its work, must in every case conform to at least three well-recognized curative agents:

First, plenty of sunlight. Each year of my experience emphasizes the importance of this factor. The architect should study and restudy his problem, "prove and prove again," keeping this as the first and greatest principle to which he must adhere; and just in proportion as he departs from it will his building be a failure.

Second, every part of a hospital, so far as possible, and especially all rooms in which the sick are treated, should have a plentiful and assured supply of *pure air* of standardized quantity, temperature and humidity. Most architects expend more labor in the attempt to attain this well-recognized desideratum, and give to it more thought than to the question of sunlight.

Third, in the general arrangement of the building and in all the details, outside as well as inside, the greatest consideration should be given to the problem of how to promote and insure cleanliness. An exterior laden with architectural ornamentation may be pleasing to the eye, but may not conduce to cleanliness. So, also, all interior details must be tested by the ease with which they may be kept clean, every part being continuously free from whatsoever impairs the cleanliness of patients according to the highest standard, — the room they occupy, the air they breathe, the multifold things used for their recovery, and obviously also the most careful personal hygiene of doctors and nurses. A hospital so constructed that it cannot supply these three indispensable factors is a departure from the best type. To these three essentials, sunlight, pure air, cleanliness, we may well add a fourth, fireproof construction. History shows that all wooden hospitals are ultimately destroyed by fire, and sometimes, alas! their occupants are also consumed.

It being assumed that one ward may now be safely superimposed upon another, the inquiry arises how many wards and how many sick persons may safely be placed in one building So many local restrictions obtain that various types of buildings result. Economy in first cost tends to create three and four story buildings. Limited sites, insufficient means, cost of land, and many other complications in thickly settled sections tend to multiply stories, and we find in some large cities hospitals of five, seven and nine stories, and one hospital about to be built will venture to run up to eleven stories. Such plans take the risk of more or less danger, although a thorough adherence to the principles of asepsis lessens the possibilities of the danger formerly so fatal. But even if the dangers are diminished, the administration of buildings with many stories must be much more costly. Comparison of different hospitals is oftentimes difficult, because the conditions and details vary so much, especially in cities.

The writer believes that when reasonable opportunities exist, even in city locations, hospital buildings should be upon the pavilion plan, not over three stories for

wards of twenty-eight or thirty patients each, with a lower floor available for purposes directly connected with the wards, but not for the continuous treatment of bed patients, thus making an aggregate of about ninety patients in each building. Any considerable excess of this number of patients under one roof approaches a danger line.

It is a well-attested experience that when too many sick persons are massed in one building the conditions operate against the very purpose for which a hospital exists, that is, the cure of the sick. It was observed during the Civil War that the wounded soldiers who were treated in temporary shelters showed the smallest mortality; those who occupied farmhouses or other permanent structures were next in the percentage of deaths; while it was in the large barracks purposely constructed for hospital use where the mortality was in many cases enormous. Crowd poisoning resulted in epidemics of hospital gangrene, erysipelas, surgical sepsis, typhoid fever and a long list of other infections. History points out many hospitals, both military and civil, which have verified this experience.

Whether the building should be one, two, three or more stories, there is a standard justified by experience for the details of arrangement which ought to be found in every ward.

What should be the best width, length, height, square feet of floor space, cubic feet of air space, and other standards of construction in the hospital unit? The arrangement of wards should not only conform to the correct standard for the recovery of the sick, but economy of administration. Florence Nightingale in her "Notes on Hospitals," a book of paramount value to every hospital worker, points out that if the cost of nursing in a large hospital be capitalized, and if the total number of patients be divided into wards varying in number of patients in each ward, it would be found that if the hospital were divided into uniform wards containing nine patients each, the cost of nursing would be £428, or $2,140 per bed per annum; but if divided into wards of twenty-five patients each, the cost would be £231, or $1,155 per bed per annum; and if wards contained thirty-two beds the cost would be £220, or $1,100 per bed per annum. These figures have proportionately advanced in the forty-one years since her book was written. The architect should therefore endeavor, the factors of land space permitting, not only to arrange the wards according to sanitary and economic principles, but also to see to it that they are planned so as not to involve the management in avoidable expense in their administration. Architects sometimes fail to remember that they have it in their power to lessen or increase the annual expenditure.

In deciding upon the number of beds in each ward, several factors enter into the proposition. First, floor space. Too much attention, as a rule, is given to cubic air space and too little to floor space. A sufficient amount of floor space is one of the most important considerations. A ward, when other standards are met, may be 28 feet wide, and for these reasons, viz., two standard hospital beds (6 feet 6 inches long) on opposite sides of a ward, with 2 feet between head of bed and the wall, will require 17 feet, and 11 feet has proved a suitable distance between the ends of beds for ordinary ward work; but if clinics with large numbers of students must be provided for, then more space is necessary. The modern tendency is against large student clinics in wards. This makes a total of 28 feet transverse linear measure from wall to wall. Economy in expenditure of force on the nursing staff must not be forgotten. Nurses always dislike to be assigned to circular wards, and naturally, as the excess of labor required for the same number of patients in a circular ward over that in an oblong ward makes an appreciable waste of their strength, without any better results for the patients.

The number of beds intended for a ward should somewhat influence the width, it being evident that a ward of six beds requires less width than one of twenty-eight. The distance between beds, from center to center, sometimes spoken of as "wall space," on the same side of a ward, is worth attention. The distances vary in different hospitals; some are as low as 6 feet and others as high as 9 feet 10 inches. The distance of 8 feet from center to center of bed is considered a fairly liberal standard for the average ward devoted to acute medical and surgical cases. But highly infectious cases, or offensive septic diseases, such as smallpox, empyema, etc., should be given 12 feet of wall space. Allowing the width of a ward to be 28 feet, with 8 feet from center to center of beds, gives a floor space of 224 feet for the two beds opposite each other, or 112 feet for each bed; and this estimate is fully up to the average first-class ward.

In determining the height of a ward, several things are to be considered, — the amount of air available and used by the patient, the distribution of air as to direction and diffusion, the supplying of fresh air and the removal of vitiated air. This problem of ventilation was practically demonstrated by Dr. Edward Cowles, formerly superintendent of this hospital, in 1879, and the details of his demonstration may be found in the tenth annual report of the Massachusetts State Board of Health for the year 1879, page 231. These experiments proved that at or near the floor the movement of air was entirely lateral; at three feet, lateral and slightly upward; at five or six feet, upward and lateral; but at fourteen to fifteen feet the movement was entirely upward and not lateral at any point: indicating that all the air above fifteen feet was of no practical value to the patient, for want of diffusion. If, therefore, we place the height of a ward at fourteen feet six inches and multiply it by the one hundred and twelve feet floor space per bed, we obtain 1,624 cubic feet of air space per bed; and yet many hospitals of good repute have only 1,200 cubic feet per bed in wards for ordinary acute disease.

Having determined the proper floor space, the height of ward and the distance of beds from center to center, the legitimate length of the ward for twenty-eight beds is easily determined. Taking the beds from one to fourteen on each side, and allowing lateral space for each end bed, would make a total of one hundred and twelve feet as the desirable length for an oblong ward. These general dimensions may be compromised by cutting down the length from one hundred and twelve to ninety-eight feet; this slightly shortens the bed spaces and cubic contents, and yet does not depart too much from good standards. If any one rule must be maintained at the expense

of any other, the distance between bed centers should be the last to be disturbed.

Sunlight being one of the three important factors in good hospital construction, then properly designed windows should receive due attention. There should not be less than one square foot of glazed window to every seventy-two feet of cubic contents in each ward. Many of the older wards maintain this standard, with seven windows on each side of the ward or one window for every two beds. But a better arrangement is to have thirteen windows for fourteen beds; these obviously are smaller windows and are apt to be opposed by architects, partly because they lessen the architectural effect of the exterior and also increase the cost. The windows should have an overhead transom, opening inward from the top, and within one foot of the ceiling. The objection to overhead drafts is less than is generally supposed, when the nurses understand the meaning of windward and leeward. The sill of the windows should be low enough to permit the patient to easily look out of doors when in bed, about thirty inches from the floor being a good height. While a plentiful supply of sunlight obtains as a rule, there are times when it is desirable to temporarily exclude it, for instance in high temperatures in summer days or where the condition of patients' eyes forbids bright light. Blinds upon the outside are dirt catchers, are troublesome in high winds and not easily managed by women nurses. Inside blinds of all patterns afford needless extension of surface for the collection of dirt, and the ward maid in cleaning only reaches the lower part. I know of no more practical way than to install cheap roller shades of light color, reversing the top and bottom at the end of one year and destroying and renewing with new ones at the end of two years. A second dark shade should be furnished to windows from which bright light must be excluded as stated above.

In mild climates the French window with door sashes opening outward, or for the whole distance to floor opening upon a balcony, are every way desirable, but this is not usually practicable in the average urban hospital. Of course this does not apply to wards with delirious or untrusty patients. In this climate double sashes in rooms occupied by the sick are not only desirable but absolutely necessary. It is easily demonstrated that with the same temperature and velocity of wind, the difference between single and double sashes varies from four to seven degrees Fahrenheit. They also assist much in allowing direct-indirect ventilation to "flush" a ward without draughts.

The general interior construction of a hospital ward should compass two desirable features: First, as far as possible, the materials used should be non-absorbent and free from all extensions of surfaces and angles or ornamentations. The walls should be of plastic finish, and there are several desirable materials now in the market which are hard, non-absorbent and ultimately covered with oil paint or enamel flat finish. The perpendicular and horizontal lines of wall finish should be coved and the windows of the simplest finish. The doors should have pine cores and be veneered, so as to be without a line or moulding. Doors properly constructed of oak or ash, when well finished and varnished, have a beautiful appearance. They should be not less than three feet and four inches wide to easily admit litters, beds and wheeled chairs.

Materials for ward floors seem to be a stumbling-block in the way of fairly good results at reasonable cost. Encaustic tiles are probably, all things considered, the most desirable; they have the drawbacks, however, of being expensive at first cost, requiring frequent repair, and are hard on the nurses' feet. Oak floors are expensive at the outset and need the best of care to justify their installation; maple and birch are not attractive in color or appearance, except selected birch, which is more or less expensive. Maple twists and curls at edges and shrinks lengthwise. There are new plastic floors in the market, ending with the inevitable "lith," which have many desirable qualities. They are not very expensive, have a fine "feel" under the feet, are not slippery, are noiseless and look well; but unfortunately, however laid, they soon crack. I know of no better material for ward floors at the present time, all things considered, than the best quality of clear rift, southern hard pine, strictly free from all defects, tongued and grooved, blind nailed, thoroughly kiln-dried and if possible laid in winter season. If properly put down, they are readily kept dressed by an inexpensive class of labor and look well enough for any grade of hospital ward. Hospital superintendents generally concede that the ideal floor still waits for an inventor.

Each ward of a large general hospital invariably requires special rooms adapted to the work of nursing. The room most in evidence day and night is the nurses' service room. It has different names in different hospitals and countries, such as duty room, service room, serving room, tea kitchen or scullery. By whatever name it is called, it should not be a scullery nor serve any purpose so that food cannot be decently served in it, which is its chief function. For a ward of thirty patients it should not be less than sixteen by sixteen feet, or two hundred and fifty-six square feet of floor in other proportions. Many architects of hospital plans, not knowing the daily ward routine, do not allow sufficient space. Often four or five nurses are distributing food on trays at the same time. To do this work properly, ample space must be allowed. The more complete service room should invariably have a terrazzo, tile, mosaic or non-absorbent floor of some kind; a dado five feet six inches high of glazed tiles, the walls above and ceilings to be well covered with enamel paint.

The service room should contain a suitable gas stove of liberal size for making hot food and drinks, with ovens for keeping broths or dishes warm, and similar uses, at all hours of day or night, and a plate warmer is also a first-class requisite.

A portable refrigerator of liberal size for keeping milk, butter, fruit, beer, etc., must be at hand. Better still is a refrigerator built into some suitable corner of the service room, with walls of the same construction as the rest of the room. It should have at least four or five compartments, each lined with slate or thick milch glass with shelves of slate or galvanized removable iron mats. If the hospital has a refrigerating plant, it might be utilized here, promoting suitable cold and cleanliness, since ice in refrigerators tends to much moisture and uncleanliness.

Dumb waiters from the basement are necessary for quick conveyance of hot food. There should be preferably one for each story only, and some recently invented electrical dumb waiters work admirably, permitting both use and control by women nurses in each ward, instead of the heedless hand methods, which porters control in the basement. It is unnecessary to say that the car should be of metal, finished with enamel paint.

A porcelain sink for dish washing, of liberal size, with hot and cold water and attached drip boards, is indispensable. A flue twelve by sixteen inches is a desideratum for the drying of dishcloths, as they quickly become foul with organic matter in their ordinary use, and they often pollute the air of a service room when everything else is clean. Dishcloths dried on suitable racks, on a sunlit balcony, is better than all other ways. Shelves for ward crockery and cupboards for dishes for special patients and for nurses' use complete the list of furnishings usually necessary. The things to be avoided in a service room are broom closets, numerous drawers, and, above all, the use of poultice dishes, fomentation cloths aud the various utensils which come in contact with patients. Construction not only, but furnishing, is conspicuously important here, as it affects cleanliness.

Every well-arranged ward should be provided with a linen closet; a counter shelf on one side only of a narrow room for the folding of linen for ward and general use, with slatted shelves above, and cupboards, and a few drawers beneath. Here, also, are kept in labeled boxes, required articles for general use, but not necessarily bed linen. Pegs, hooks and similar fixtures are placed on the opposite wall for hanging splints, surgical cradles, crutches, etc., thus saving the nurses many steps in obtaining them from more distant places.

If it can be suitably arranged, a utility closet at the opposite end of the ward from the linen room, for keeping such articles as are used in bed-making, is desirable, and saves a nurse's strength.

Concerning the bathroom little need be said, except that the building materials should be non-absorbent, light in color, with white floor and walls, so as to easily show dirt. The tub, preferably of porcelain, should always be placed in the center of the floor, and accessible on all sides for the lifting of patients. A utility sink for nurses' use may be installed here, if room cannot be found elsewhere. Such work as cleansing rubber sheets, washing surgical dressing basins, making poultices, washing catheters and patients' toilet basins, and much other indispensable ward work obviously must not be done in the service room sink. But inevitably this work will be done there or in the bath tub, if a proper utility sink is not provided.

It is now generally understood that water-closets, urinals, etc., should have the same building materials as the bathrooms. Some hospital superintendents are omitting urinals, which are so difficult to keep clean, and unless perfectly kept they become the most offensive fixture of the ward. Slop hoppers, suited to the use of bedpans and urinals, must be placed here. A ventilated closet, for dejections to be inspected by the doctors, is a hygienic and desirable feature.

Toilet basins for patients should not be combined with the bathroom nor with the water-closet, but in a room or alcove by themselves. Apparatus for hydrotherapy, X-ray or crematories for ward refuse should not be a part of the ward outfit, but are best arranged as a separate equipment or department, to which patients or materials may be taken from many wards. This plan is better for the patients, as well as for economy of administration.

A few other helpful things are necessary to make a perfected ward. A room for patients' clothes is required, with suitable metal stalls where the clothing may be hung up and exposed to the air, thus promoting cleanliness. Patients' clothing should never be done up in bundles nor placed in small "cages." This room is best when not heated, but requires a liberal fresh air inlet, and an outward "vent" that ventilates.

Hospitals vary in the method of installing what is comprehended by the words "medicine closet." Some keep the medicines in a conspicuous part of the open ward. The writer believes this to be a bad practice for reasons that cannot be elaborated here, and unfortunately sometimes it is entirely overlooked in the building plan. It should also not be placed in the service room. The best location is in the corridor, at or near the main entrance to the ward, the doors opening at the wall line, and constructed into some room space but accessible only from the corridor.

It should have a counter shelf of slate or dark marble with a fourteen-inch aluminum set bowl, with hot and cold water, drainage and one electric light pendant. The shelves should be of slate or glass, both above and below the counter shelf. Such an arrangement is a help to cleanliness, promotes greater certainty in its work, and saves undue expenditure of effort on the part of the nurse. A special inside closet with alarm or other control is desirable, in which to seclude medicines marked "Poison."

In the larger teaching hospitals a special room for surgeons or physicians is considered necessary, in which patients may be examined or dressings changed. Indeed this is desirable in most wards, if the floor space permits. In small hospitals one or two isolating rooms for special cases should not be forgotten.

A caution is necessary in planning a ward lest, in taking the floor space required for all these special objects, the length of a ward becomes unwarrantably long, or that floor space that should be given to patients is cut down; in either case the construction cost per bed would be somewhat larger than the *pro rata* which usually obtains. Not more than twenty per cent to twenty-five per cent should be allowed for rooms not devoted to patients' beds. This is one of the causes of increased cost of hospitals, but surely it is just these things that make hospitals of the best type, just as the up-to-date business office block is more costly but more efficient than the former styles.

The topics of stairways, fire escapes, elevators, roof airing courts, heating, ventilation, operating rooms and hospital administration, as well as ward furniture and equipment, are indirectly connected with the title of this paper; a part is technical, but belongs to general building construction and requires careful consideration, but cannot be discussed here. From observation and the records of experience I have brought together briefly the essential features of a hospital unit, intended to secure the three great essentials for the cure of the sick, sunlight, fresh air and cleanliness.

The Work of an English Hospital Architect, H. Percy Adams. II.

(*Article I on page 139.*)

BY R. RANDAL PHILLIPS.

A DESIGN which has attracted a great deal of attention is that for the King Edward VII Sanatorium, now being erected at Midhurst in Sussex. About two years ago a competition was held for the best essay on a sanatorium for consumption in England, Sir Ernest Cassel having placed $1,000,000 at the disposal of his Majesty the king "for any philanthropic purpose he might have in view." The prize of $2,500 was duly awarded, but the sanatorium is not being built according to the prize plans, but from those prepared by Mr. Adams, who paid a special visit of inspection to the most modern sanatoria in Europe last summer; so that his plans may be considered as embodying the best and latest practice in this branch of hospital work.

THE KING EDWARD VII SANATORIUM AT MIDHURST.
(For elevations and plans, see plate form.)

The site consists of one hundred and seventy-one acres and is four hundred and ninety-five feet above sea level, backed and protected by a lofty pine grove. The sanatorium will have accommodations for one hundred patients — fifty male and fifty female. The original intention was to provide for those belonging to a class just above the very poor, such as teachers, governesses, clerks and shop assistants; but his Majesty did not think it right that those who could afford to pay for skillful treatment should be excluded from the benefits of the institution, and so, of the one hundred beds, eighty-eight will be assigned to the more necessitous classes and twelve to the well to do.

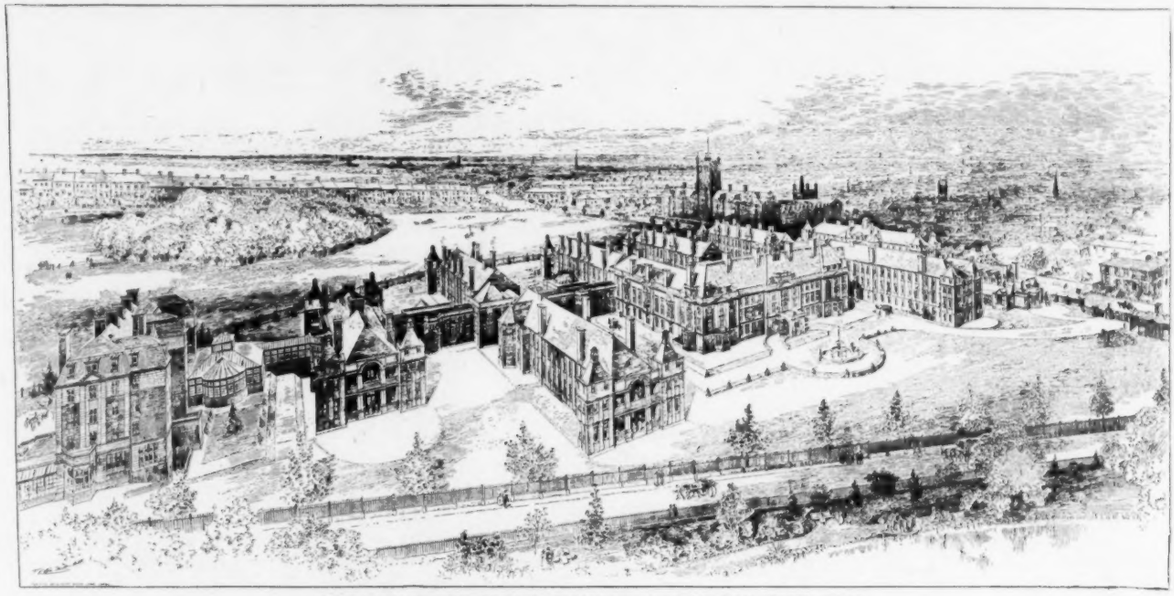
The sanatorium itself will be divided into two distinct parts: (1) the administrative building and (2) the patients' building, these being connected by a broad central corridor enclosed on the ground floor only. Both buildings are planned on parallel lines east and west. The accommodation provided in the administrative building is shown by the accompanying plans. On the lower ground floor, under the medical officers' apartments, are the porters' rooms. On the second floor are the thirteen nurses' bedrooms, facing south and west, with two bathrooms attached; while on the first and second floors, reached by a separate staircase, are bedrooms for nineteen servants.

The patients' building is divided into three distinct blocks, connected by corridors on each floor. On the first floor of the center block are fourteen bedrooms (two as spare rooms for the well-to-do class), each fourteen by eleven feet three inches and eleven feet high, thus allowing 1,730 cubic feet per head. There are also two sitting rooms. All these rooms have a balcony, eight feet wide, facing south, and it is arranged that each patient shall have a part screened off for his or her use with canvas fall-down blinds. A bathroom for every three patients is also provided, and an attendant's room. There is a covered promenade fifty feet long, for use in wet weather. It will be noticed that the well-to-do patients have separate access to the grounds, the hydro-therapeutic department, medical consulting rooms, dining hall and main entrance.

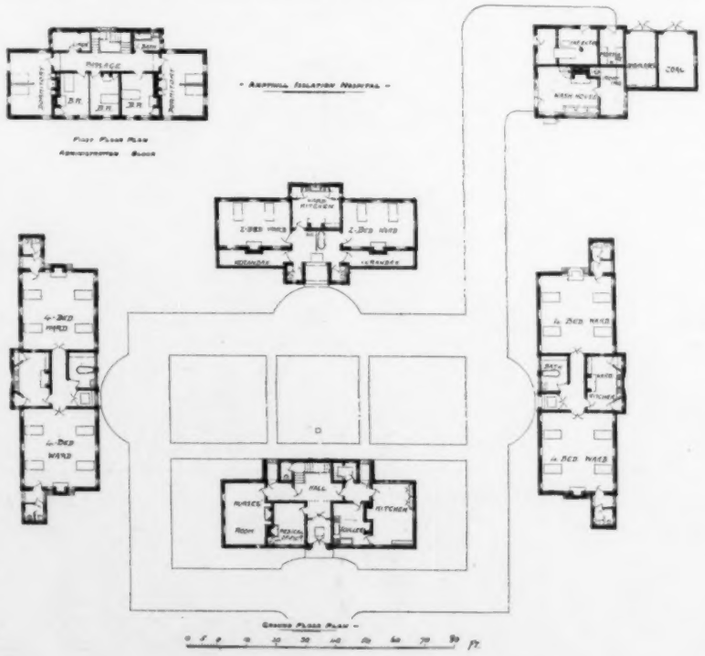
On the top floor of the central block is accommodation for twenty-two necessitous cases and one spare room. These wards are each thirteen feet six inches by eleven feet six inches and eleven feet high, giving 1,700 cubic feet space per head. They are intended for patients too ill to leave their rooms and are provided with a balcony. Owing to their central position they can be easily served from the kitchen (a subway connecting the two food lifts); they are also accessible from the medical officers' and

nurses' quarters and are near the passenger lift. The wing on each side of the central block has a covered promenade one hundred and fifty feet long. On the ground floor, but raised at least seven feet above the ground, are sixteen bedrooms, sixteen feet by eleven feet three inches and eleven feet high, giving 1,980 cubic feet per head, with a terrace eight feet wide in front and with nurses' rooms, linen rooms, bathrooms, etc., arranged similarly to those on the first floor, though the balcony is here smaller (four feet three inches wide). At the extreme ends of the buildings are small fire-escape staircases giving access to the shelters or *liegenhallen*, which it is contemplated to build. On the male patients' side workshops have been provided in the basement. The cost of the sanatorium is estimated at $375,000. The chapel is a very interesting building, in shape like a Y, the men being in one arm of the fork and the women in the other. The arms have open arcades, and thus the patients are kept in the fresh air while at service. In summer time the preacher will occupy a pulpit in the open space between the arms.

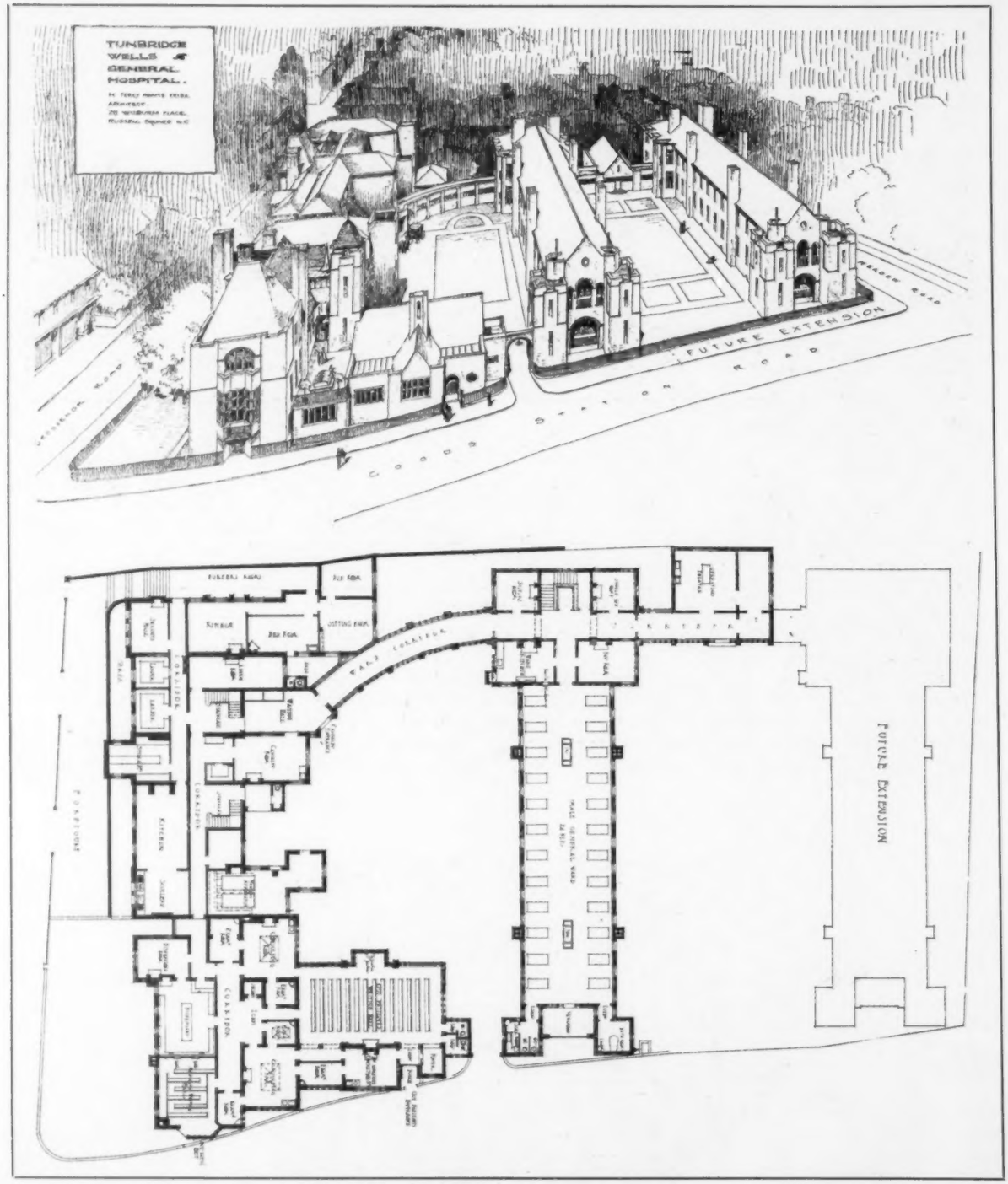
At Newcastle-on-Tyne the very extensive Royal Infirmary is being completed from the designs of Mr. Adams and Mr. Newcombe. This has been in progress of erection for four years and will involve an expenditure exceeding $1,250,000. The site is on the Leares. Altogether there will be four hundred and fifty beds, two hundred and twenty of which will be for surgical cases and one hundred and eighty for medical, the former being accommodated on the ground floor and the latter on the first floor, with the fifty children in a separate pavilion. These beds are contained in eight ward pavilions running parallel with one another and axially due north and south. The pavilions are spaced at intervals of seventy feet and are two stories high, except at the lower end of the site, where an additional story is provided. The wards are one hundred and two feet long, twenty-seven feet wide and thirteen feet high, and accommodate twenty-four beds each; this gives an area of 1,492 cubic feet per bed, the window space being in the proportion of one square foot to every sixty-four of cubic air space. The wards are self-contained and can be shut off from one another in case of need. The administrative department is centrally placed



THE ROYAL VICTORIA INFIRMARY, NEWCASTLE-UPON-TYNE.



PLAN, AMPTHILL ISOLATION HOSPITAL.



GENERAL HOSPITAL, TUNBRIDGE WELLS.

among them and contains all the necessary rooms for officers and staff as well as students. Here the kitchen is on the second floor. A main corridor runs the whole length of the buildings. At the extreme west end of it, on the highest part of the site, is the nurses' home, accommodating over one hundred nurses, and at the opposite end of the corridor the out-patients' department, one story high. On the north is a chapel to seat one hundred and fifty patients, with a gallery for nurses. The rooms for the reception of accidents, etc., are at the rear of the administrative block, and the laundry and boiler house are at the southwest corner of the site, this

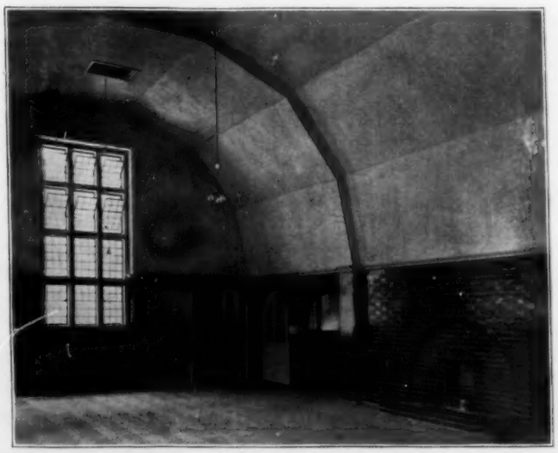
being the lowest level. The elevations are of red brick and stone, and the roofs are covered with Westmoreland slates. It is expected that the hospital will be ready for opening in August, next year. The operating theater is interesting for the gallery arranged about seven feet from the floor. This has been provided for the students and dressings and tiled roofs, teak floors, walls lined with glazed brick dadoes painted with enamel paint above, except the bathrooms, which are tiled. Ventilation is provided by fresh-air inlets at floor level and extracts at the ceiling. The cost of the hospital will be $50,000.

The cottage hospital erected at Woburn for the Duke

CHILDREN'S WARD, GENERAL HOSPITAL, TUNBRIDGE WELLS.

gives them an excellent view of the table, a desideratum not always secured by the usual tiers of steps. The introduction of this gallery was decided upon after Mr. Adams had made investigations into all the other arrangements adopted in hospitals throughout Europe, and it is expected that it will be very satisfactory, he having already built one on a similar plan at Westminster Hospital.

An interesting little infectious diseases hospital is being erected from Mr. Adams's designs at Ampthill in Bedfordshire. The accompanying plan shows that the buildings are arranged around an open square, the administrative block being on one side and the ward blocks on the other three, a laundry and mortuary being arranged adjoining. The buildings are of brick, with Bath stone



OUT-PATIENTS' HALL, GENERAL HOSPITAL, TUNBRIDGE WELLS.

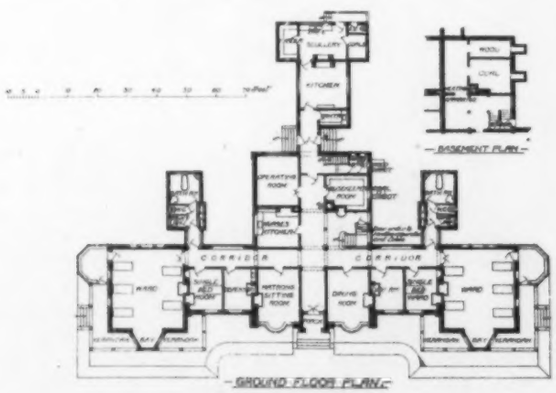
of Bedford is quite a different kind of building. Here the architect had practically a free hand. The site itself is a beautiful one, facing due south. All walls are of brick rough-casted on the outside with solid half-timber work — oiled oak — around the entrance, and the roofs covered with red Broseley tiles. The ward floors and staircases are of teak. The wards and the operating theater are tiled for a height of five feet. It will be observed that at each end of the building is a ward one story high, the kitchen at the rear being also of one story only. In the basement of the latter are the boilers for heating and hot-water services, and also complete plant for lighting the rooms by electricity and pumping the water from a supply nearly half a mile away. The sketch plans were made by the

COTTAGE HOSPITAL AT WOBURN.

Duchess of Bedford, though of course all the working-out of them and the designing of the elevations was done by Mr. Adams.

The General Hospital at Tunbridge Wells, in Kent, has been considerably enlarged by the erection of new wards for all the patients, with out-patients' departments, operating theater, etc. The old hospital will in future be used solely for administration purposes, and contains all the rooms for the committee, medical officers, matron, nurses and servants, as well as the kitchen department and the hot-water and heating plant. The disposition of the rooms on the ground floor is shown by the accompanying plan, and it is only necessary to add that the children's ward comes over the dispensary, etc., and that above the long male ward is one exactly similar for women. I need not enlarge on the finishings of the hospital, as these are much the same as those I have described in connection with the Belgrave. The buildings are of red brick with tiled roofs and will cost about $120,000.

Of hospitals being, or to be, erected from Mr. Adams's designs, other than those already mentioned, are the Bristol Poor Hospital, a very large building providing eight hundred and fifty-two patients' beds and estimated to cost $750,000; the British Hospital at Constantinople; new nurses' home, operating theater, etc., at the Women's Hospital in Marylebone Road, London; and the rebuilding of the Women's Hospital in Soho Square, London. It will thus be seen what a number of important hospitals Mr. Adams has designed. His plans show a consummate knowledge of the requirements and are symmetrically arranged in every case,



PLANS, COTTAGE HOSPITAL AT WOBURN.

HALLWAY, COTTAGE HOSPITAL AT WOBURN.

while the elevations are essentially distinctive; they especially exhibit a fine feeling for proportion, and there is a total absence of the hotchpotcheries unfortunately so characteristic of many architects who have large practices. Mr. Adams's buildings mass and group well, and though they may not always meet with the approval of the man in the street, the architect has the satisfaction of knowing that his work is appreciated by those of his fellows whose good opinion he might rightly cherish, and that, after all, is the greatest satisfaction any architect can have. (*Concluded.*)

The "Place Royale" in Paris.

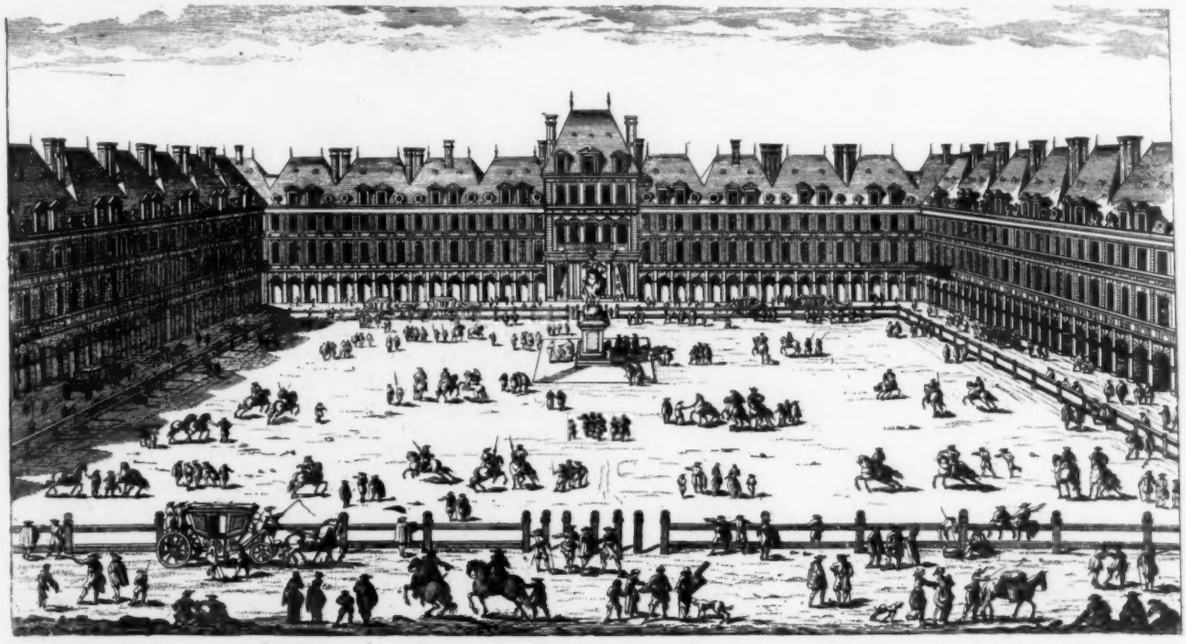
BY JEAN SCHOPFER.

AT the beginning of the seventeenth century, under the reign of King Henry the Fourth, restorer of religious peace in the Kingdom of France, one began to build again, after a long period of civil war, during which all great architectural enterprises were abandoned.

After so many struggles and so much agitation, money was scarce, it was impossible to be sumptuous and extravagant in architecture. On the other hand, the taste for constructions in brick had been developed in France by the theories of the Italian Renaissance. Being cheap and being the fashion, brick was the material chosen and preferred at the beginning of the seventeenth century.

The Place Royale is interesting in several ways. In the first place, it has been entirely built at the same period and on the same plan. We have here, and perhaps for the first time, a square planned in its *ensemble* where all the houses have uniform façades, with a central pavilion in each side. Here then great symmetrical effects are sought for, as they will be later, on the Place Vendome, and we have a large square, the handsomest in Paris at that period, that shows us architecture of red bricks and white stone combined.

In the second instance, this Place is for us full of historical recollections. It has been *the* Place of the seventeenth century; it is there that society met, that rendezvous were given. How many comedies of Molière have as stage scenery this row of houses? Madame de Sévigné lived there; the arcades of the ground floor sheltered many adventures of young noblemen; Mascarille intrigued there; young girls sighed and waited in its shadow. All the brilliant, witty life of that period had for outward frame these red and white houses.



THE PLACE ROYALE, PARIS.

Bricks mixed with stone were used in a simple style of architecture, that had but rarely recourse to sculptured decoration, and drew its greatest effects from the harmonious blending of the bricks and the stone. One obtains in this way buildings that have bold lines and a cheerful aspect, that cost but little. It is on these lines that, in 1604, Henry the Fourth planned the new Place Royale.

An old engraving says that the king had the intention of using these houses for workmen. It is almost superfluous to say that it never was the intention of the king, for in the seventeenth century still less than in our days one did not build houses for work people with ceilings fifteen feet high and rooms measuring thirty by twenty-two feet. No, the plan of the houses of the Place Royale, that is now called "Place des Vosges," shows sufficiently that they were built for rich tenants, nobles or wealthy commoners.

Architecturally the houses of the Place Royale are built on a uniform plan. Arcades on the ground floor run all around the Place; they rest on massive pillars and are groined vaulted.

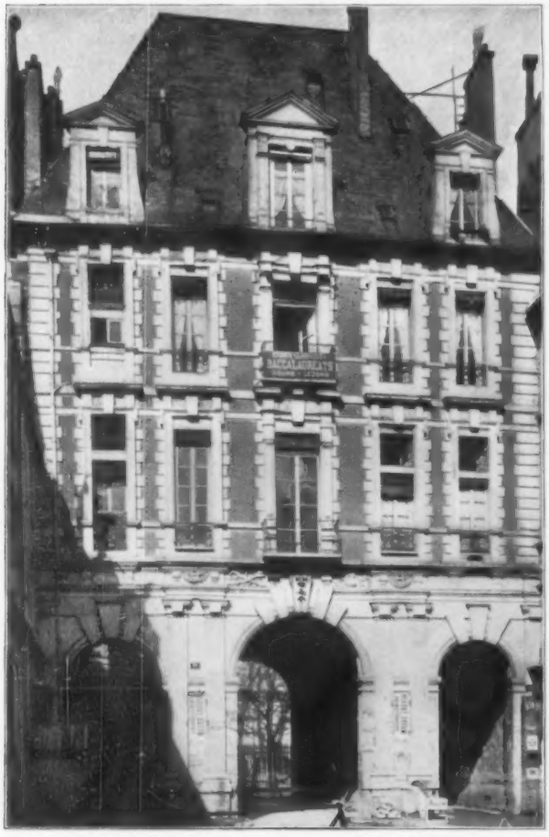
The idea of arcades around a square is excellent; Bologna is entirely planned in this manner. It is unfortunate that in modern cities there are so few sheltered promenades. In the houses of the Place Royale one can reach the foot of the staircases in a carriage, so you see that the custom of permitting rich tenants to enter their carriages under shelter does not date from to-day in Paris.

Another plate shows one of the houses with a double façade, one on the Place Royale, and the other on the rue de Birague. On the façade rue de Birague the ground

floor is ornate with four pilasters; on the frieze the decoration bears the royal H; the windows are framed in white stone, and on the roof are handsome dormer windows.

In the façade of the Place Royale the keystones of the archivolts are in relief, and chains of stonework continue up to the roof the pillars of the first floor. The roofs — and that is very characteristic of the period — are high and steep. They are the roofs of the Middle Ages, of a period when common sense and experience reigned all powerful in architecture.

In France, as in all countries situated in the same



DETAIL, THE PLACE ROYALE.

latitude and near to the sea, heavy rains are frequent in the bad season; in consequence, to protect their buildings, architects built high and steep roofs, so that the water should be carried off rapidly. These roofs are the only ones in French architecture during the Middle Ages; architects made virtue of necessity, which ought always to be the rule, and drew superb and architectural effects from these great inclined roofs; chimneys became monumental, dormer windows also, and we see these beautiful and picturesque roofs that last all through the sixteenth century in the French castles and houses.

New ideas came into fashion with the so-called Italian Renaissance; flat roofs and even terraces had been built in the Orient, in Greece and in Rome in pagan times; the Renaissance sought to imitate antiquity, and soon it was decreed that Italian terraces and flat roofs were alone noble. Leaving aside the fact that Paris was in a very different climate to Athens, roofs were diminished, became low and even flat, as though they were ashamed to be seen, like those of the palace of the Louvre or of Versailles. The palaces of the sixteenth and seventeeth centuries show us terraces and balustrades.

Nevertheless the meteorological law of France had not changed with the public taste; it continued to rain as in the past, as in the Middle Ages, as it had always rained and as it will always rain in France. Terraces were very difficult to keep free of water; the pipes leading downwards from them got choked by the leaves in the autumn, and large pools of water were formed above the apartments; infiltrations occurred, and ceilings were seriously damaged, which necessitated costly repairs. All these facts were not taken into account, and the noble style reigned supreme. The steep and picturesque roofs, with their monumental chimneys, were things of the past.

Still it was cold in winter, and rooms had to be heated. To have fires one must have chimneys, and for chimneys to draw well they have to be a good deal higher than the roof, or the smoke is forced down into the rooms. A cruel conflict exists between fashion, that declares that it is contrary to the noble style to see chimneys on the roof, and the need of comfort that requires warm rooms and fireplaces that do not smoke. One has arrived at this absurd arrangement to place small chimney tin pipes that crown noble and majestic buildings covered with terraces; they may be seen on the fine palaces of Gabriel, the glory and ornament of the Place de la Concorde in Paris.

At the beginning of the seventeenth century it is established that the good and sensible traditions of the Middle Ages were not extinct. The roofs of the Place Royale are high and picturesque, with monumental dormer windows. In the old engraving that we give one can see how the buildings stood in olden times; the line of the roofs and of the chimneys is fine and well balanced; the arrangement of the dormer windows is also to be noted. The high price of living and the want of space, the two evils that all modern towns suffer from, have obliged the landlords of these houses to locate apartments in the large lost spaces of these roofs; thence the disorderly aspect of the actual roofs of the Place des Vosges, whereas formerly they offered a fine symmetry of dormer windows, oval windows and monumental chimneys.

To be noted also in the illustration is the way in which the frame of the windows is continued from story to story. It is a tradition dating from the sixteenth century. When it was wished to let air and light into the dark castles of the Middle Ages large pieces of stonework were opened up from the ground floor to the roof, and for long afterwards in French architecture the custom was kept up of marking the framework of the windows from story to story.

The center of the Place was surrounded by fences; a statue of Louis the Thirteenth was placed in the middle; then an iron railing was put around it. The Place was bare in the seventeenth and eighteenth centuries; now it is planted with trees, it has become a green and shady space where the children of the neighborhood play. Victor Hugo, already famous though young, lived in one of the mansions of the Place des Vosges. The house has become a museum in which have been placed a hundred tokens of the art and of the life of the great poet.

ARCADES OF THE PLACE ROYALE.

THE PLACE ROYALE.

UNIV. OF MICH.

The Business Side of an Architect's Office. VII.

BY D. EVERETT WAID.

A WELL-KNOWN architect writes me concerning the fact that clients often trespass upon the architect's time. He says: "In my own schedule of charges I have a clause stating that an additional charge will be made for material alterations to a design once approved by the owner, but I am not always able to enforce payment. In one case, for instance, after the contract had been signed, the owner found that for about $2,000 he could change the rear wing of the building from wood into stone. This necessitated discarding all the original scale and full-size drawings and a general refiguring of the entire set of plans, and yet I received no extra compensation for this work other than the increase in the regular commission, which was not enough to pay for the additional work; nevertheless the owner felt convinced that I was making an excessive demand in asking for something above the five per cent on the extra cost."

Before commenting on this matter I will mention some other grievances of architects to which my attention has been called. One complains of the time consumed in shopping trips for the selection of tile work, hardware, etc.; clients insisting on having special devices designed when it is usual to specify those in stock and on the market; clients requiring consultations at their residences (often at night), which are looked upon as a matter of professional practice rather than as an accommodation. One architect writes me of another of our troubles as follows: "One hears a great deal about architects leading their clients into excessive expenditures, far beyond their contemplated investment. To cite an opposite case I had a client who made it very plain, both verbally and in writing, that he would not spend more than $10,000 in altering his house, and certain requirements were insisted upon which compelled the use of inferior materials. No sooner was the contract signed than he immediately commenced to add to the building, so that there was scarcely anything left of the original contract when the alterations were completed. Nearly every drawing had to be discarded in the process of elaborating the building; dozens of drawings were made over and over again, and finally, after three years, this alteration was completed at a cost of nearly $24,000. Naturally there had been considerable waste of time and money, many things were not as they would have been had the building been properly planned with the view of spending somewhat less than was ultimately spent, and I did not receive anything more than the regular commission for all this nonsense."

Speaking in a general way, every line of work has its drawbacks, and injustice plays a part in every man's business. A contractor has to figure on contingencies which in one case bring him a larger profit than he estimated, and in another make him congratulate himself if he got out even without a dead loss A real-estate broker will make a deal in which his percentage will net a handsome fee with but little effort, against another deal consummated after long, tedious and expensive effort and with small return. A merchant gets larger profits on some goods than others, and a physician does a lot of his hardest work for little or nothing. This is not to say that architects should not try to right wrongs and stand together as a profession to improve conditions. But we may say that architects must recognize that they should take a businesslike view of their work,—look at it from the clients' side as well as their own, and be ready to pocket a loss calmly as an investment which may bear fruit in the future.

There are frequent discussions in the professional press as to the proper basis of architects' charges. One states it as a "fundamental fact that the five per cent rule has now been raised to the dignity of a principle," but denies that it is defensible as such. There are troubled inquiries into the increasingly complicated demands on an architect; discussions of expert fees, shop drawings and quantity surveying. There is, too, an unjust disparity evident when one sees on the one hand a successful architect with a million-dollar building which he places in the hands of a general contractor who relieves him of an immense amount of detail work and even supervision; while on the other hand, another architect painstakingly sublets less important work, and practically superintends as well as supervises the execution; and yet both draw five per cent. But after all is said, the percentage system seems as simple and fair as anything that can be devised. One architect is ready to give over fees and accept a salary; perhaps he would expect $5,000, and perhaps $100,000. Another says to his client, "Pay all my expenses and give me as much more." Who shall say that the percentage system is not most just to both sides? The one lesson I would draw is that architects should keep their office records with sufficient accuracy to know exactly what all the expenses on a given work have been; to thus learn whether his usual charges are on a fair basis, so as to be able to say to a reasonable client in any special case, "My actual outlay due to revising finished and approved working drawings was so much."

This brings us back to the grievances quoted in the beginning of this chapter. Let us constantly try to right the wrongs. Clients will meet us halfway when they are made to understand the true conditions. But at the same time let us remember that a five per cent fee or a ten per cent fee is not an absolutely scientific thing, subject to the last analysis. For example, the careful selection of hardware and writing of detailed specification for same may, on a given building, cost the architect fifty per cent of the entire cost of the hardware. On the same building the time given to selection of a lot of expensive mantels may happen to be very trifling. The average, when struck on the whole building, gives fair results; but the illustration shows how unjust it is on the part of a shrewd client to say that he will himself select the mantels or let certain contracts himself without the architect's aid, with the purpose of cutting the architect out of his commission on those particular parts of the building.

As to the client who expects calls at his own home or the unreasonable man who makes changes and doubles the cost of his work, these are matters of "the personal equation"; each case must be dealt with on its own merits, with all the tact and diplomacy at command.

(*Concluded.*)

Fireproofing.

MORE LESSONS OF THE BALTIMORE FIRE.

IF all the published comments on the lessons of the Baltimore fire were to be collected in a volume it would be a most stupendous affair and beyond the patience of any one reader. We will burden these columns with but one more notice on the subject. Captain John Stephen Sewell, U. S. A., gave an address at the annual banquet of the National Board of Fire Underwriters, in the course of which he presented several very carefully considered conclusions. He claims that it is evident no building stone of any kind is even reasonably fireproof. The amount of stone should be kept down to a minimum, and it should not be used at all above the second story except possibly for window sills. More mass is required to resist a fire than to carry superimposed loads. In the craze for lightness and cheapness the modern fire-resisting building has been reduced to a degree of flimsiness wholly inconsistent to satisfactory behavior in a severe fire. The minimum thickness of an outside wall should be from sixteen to eighteen inches. Outside walls only a brick and a half thick were badly cracked at Baltimore. They had not mass enough. Yet their behavior indicated that another half brick would have made them thick enough in the upper stories at least.

The standard of workmanship in these buildings was very low, often criminally so. It may be said that much of the damage at Baltimore was due to poor workmanship as well as to flimsy design. Many terra-cotta partitions and column coverings were so loosely laid up that they were entitled to fall down without any other excuse at all. There were cubic yards of brick in the walls of the Continental Trust Building which were simply thrown in loose without any pretense of laying. It should be remembered that good workmanship may save a defective design, but no excellence of design can adequately protect against dishonest work.

The foregoing we quote from Captain Sewell's address.

EXPERIMENTS WITH CAST IRON.

THERE was recently published in the *Journal of the Franklin Institute* an exceedingly interesting report of some experiments made by Alexander T. Outerbridge of Philadelphia, on the action of cast iron under alternate heating and cooling. The fact that iron will increase in bulk quite perceptibly by repeated heating and cooling has been known for a long time, and this property has been made use of in many ways, as in fitting portions of machinery together or in fitting vault doors to their frames, when the metal is frequently fitted roughly quite loose and then by judicious heating is coaxed up to an exact fit. So far as we know, however, no scientific investigation of this property of iron has been made before Mr. Outerbridge's experiment. In one experiment two test bars were cast from one ladle of iron in one mold from patterns of same dimensions, 15 inches long and 1 inch square in section. When the bars were cleaned and measured they were found to be exactly 14 3-16 inches long and 1 inch square in section. One bar as exhibited at the Institute remained exactly as cast. The other had been caused to grow gradually in cubical dimensions until it was 16½ inches long and 1⅛ inches cross section. The bar so enlarged weighed precisely the same as it did before growth, but the specific gravity was of course less than before. A quarter-inch section of a similar test bar before expansion was found to have a specific gravity of 7.13, which would mean a weight per cubic foot of 444¾ pounds. A similar section of the same bar, after having been expanded about thirty per cent in cubical dimensions, was found to have a specific gravity of 6.01, which would mean a weight per cubic foot of only 375½ pounds, a difference of 69¼ pounds per cubic foot.

The experiments which led up to these results appeared to show that there is a certain critical temperature which produces the greatest degree of expansion per heat. The bars to which reference was made were heated in a casehardening furnace provided with a pyrometer. In order to prevent scaling or oxidation of the surface the bars were enclosed in an iron pipe, the ends being stopped with clay. Successive heatings at a temperature of about 1,200 degrees for one hour required nearly a hundred heats to obtain an increase in length equivalent to about one inch per foot. When the temperature was increased to 1,450 degrees Fahrenheit a much greater gain in dimensions occurred, averaging about 1-16 inch per heat.

The sample bar which had been increased 1 11-16 inches in length and ⅛ inch in cross section had been heated twenty-seven times at the temperature of 1,450 degrees. The experimenter stated that it had not yet ceased growing, and there is no exact knowledge as to what limits the total possible expansion. Experiments are still being made in this direction. This extraordinary increase in volume is not accompanied by any evidence of any disintegration of metal, and but slight changes in structure are visible to the naked eye. The bars are smooth, straight and have sharp corners.

A PROPHECY OF THE BALTIMORE FIRE.

WHEN a great conflagration such as the Baltimore fire sweeps through a city, the first feeling experienced by the community is one of surprise that it should have happened at all, and this is followed by a wholesale production of wise rules for avoiding such fire in the future. These rules, however, are promptly forgotten within a very short time, and the next conflagration finds the public and often the profession in the same surprised mood. We were impressed with this by reading an interview which appeared in the Boston *Herald* over three years ago, in the course of which John S. Damrell, who was at that time the Commissioner of Buildings in Boston, made a number of statements in regard to fire hazard which were exactly along the lines of what we have seen so constantly this year in the technical papers apropos of the Baltimore fire. It will be remembered

that Captain Damrell was the fire chief in command at the time of the Boston fire in 1872, and he speaks in the light of his experience in that capacity as well as his knowledge of building operations. The behavior of exposed metal, of stone and marble and all forms of combustible material in a great fire was the same ten years ago that it is to-day, and as it undoubtedly will be ten years hence. It is only lack of knowledge which keeps the public from building in a thoroughly fireproof and fire-resisting manner. The daily press occasionally indulges in spasmodic editorials against the methods practised by architects, but citizens need not be reminded that architects are like other men, good and bad as well as indifferent, and that when citizens desire good work, when fireproofing is really asked for by the public, good architects, perfectly able to design and construct such buildings, can always be secured. Just after a great fire the public wants the best, but when the bids come in, unfortunately, fireproof construction often has to give way for a cheaper and less resisting medium. We do not anticipate that Baltimore will really profit by her disaster to the extent of so rebuilding as to prevent entirely a repetition. So long as insurance companies exist and private greed is willing to saddle on the community at large the individual losses, just so long will it be possible to predict future disasters of this sort, and the most we can hope is that, by constant reiteration of the moral of such fires, in time a public sentiment may be cultivated to the point where it can no longer be a question of what the individual thinks he can pay for, and the absurd provision existing in nearly every city that fireproof construction shall be mandatory only in buildings above a certain height shall have given way to the more rational conception that in a great city, with its immense chances for loss, the fireproofing ought to be by districts horizontally, rather than measured in feet vertically.

BEST KIND OF FIREPROOF BUILDING.

THE best kind of fireproof building is one surrounded by fireproof buildings. But in a new building to be erected in a dangerous district, or a structure that is to contain a very large amount of highly combustible material, greater precautions ought to be taken with the tile construction than now obtain in the manufacture of the cheapest fireproof tile that conditions compel manufacturers to make. People will not pay for any better, or at least the ordinary run of people will not; and while the manufacturers are undoubtedly public-spirited men, their zeal for the public welfare does not extend to the point of giving gold where silver is demanded and paid for.

The trouble is with the architect, and I must say too with the underwriter and the building ordinances, and not with the principle of fireproof construction as far as the structural portion of the building goes. Tile floors and tile partitions can be made to meet any condition that the mind of man can conceive as possible. The principle of the thing is sound, and the application, I must say, in spite of the conditions that obtain, is far better than should be expected for the price paid. Many city ordinances and some of our insurance experts make a general class, a hodgepodge, of fireproof construction. Anything that does not actually burn they call fireproofing. Tile work is bundled in with ordinary cinder concrete and all sorts of inferior constructions, and there you are. Why, it is only within the last two years that some companies have gotten over the notion of classifying alleged slow-burning timber construction *ahead* of steel and tile, a preferred mode, a better risk! We know that people, particularly those of speculative intent, will only build as well as they are compelled to by law or by the rules made by those who will indemnify them in case of loss. — *Insurance Engineering.*

SAFETY FROM FIRE IN THEATERS.

WE are glad to state that the proposed Massachusetts enactment intended "to provide for greater safety from fires in theaters," to which we referred in our last issue, failed to pass the Massachusetts Legislature, though the bill introduced by Edward Atkinson, to enforce a more rigid inspection of theaters, has fortunately become a law. It is not too much to say that there is not a theater in any large city in this country which in every respect fully complies with the spirit and intent of existing laws. After the Iroquois Theater disaster, Boston as well as many other cities made a brave showing of zeal in the inspection of its places of amusement; but the reports of the special examiners for this purpose have never been made public, nor are there any marked signs of improvement in the existing conditions. It remains to be seen whether Mr. Atkinson's bill can go any further than to provide another office to be filled.

FIRE RESISTIVE.

IT seems to be no longer the correct thing to speak of a fireproof building, since so many of them have been called upon to endure not only the scathing effects of a conflagration, but also the burning criticism of experts, and accordingly a new word has been coined which seems to fit the case exactly and which has been adopted out of hand by many of the technical writers. Hereafter we shall not build fireproof structures, but we will erect *fire-resistive* buildings, and our *fire-resistive* materials can thereafter never be charged with having fallen short of whatever was claimed for them.

FIRE-RETARDING WOOD.

DURING April a fire occurred in the Flatiron Building, New York, which was quite a satisfactory test of the qualities of the wood which was used for the trim, all of which has been treated so as to be fire resisting. The fire broke out on the twentieth floor, and the damage was confined entirely to one room. Furniture and other contents were consumed, and the heat was sufficient to melt the glass of the chandelier. The fire did not spread beyond the room in which it started, was extinguished with hardly any notice thereof by tenants below, and the wood finish was only superficially charred.

Editorial Comment and Selected Miscellany

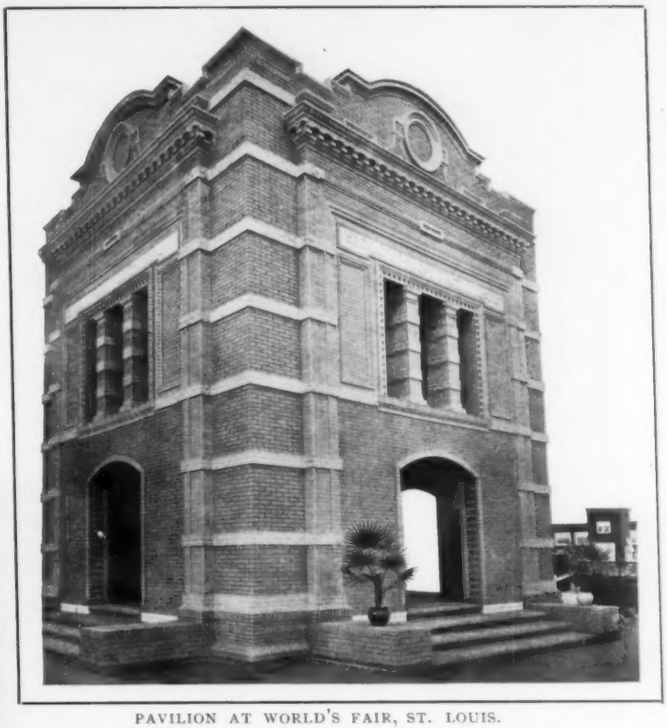
OAKLAND, CAL., SCHOOLHOUSE COMPETITION.

WE have received from our San Francisco correspondents a printed "notice to architects," sent out by the Oakland, Cal., Board of Education, calling for competitive plans for six different schoolhouses, aggregating in cost about $600,000. This notice contains a number of provisos which are quite objectionable from the professional standpoint, and which have called forth from the San Francisco Chapter of the American Institute of Architects a vigorous protest embodied in a series of resolutions. The really vital points of objection are

TERRA–COTTA PAVILION, WORLD'S FAIR, ST. LOUIS.
Exhibit of the Northwestern Terra-Cotta Company.
The exterior of this pavilion is cream-colored enamel terra-cotta up to the base of the dome. The crestings are gilded green glaze, and the top of the dome is a lighter green glaze. The interior shows several colors, the ceiling of vault being blue, with gold stars.

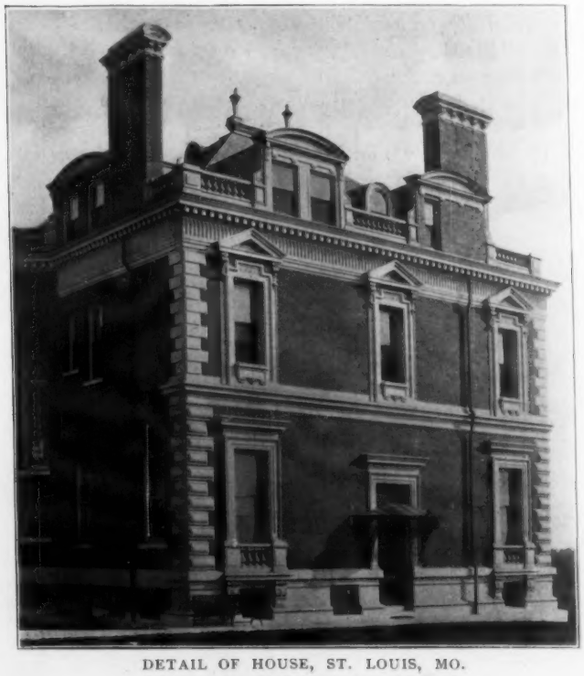
that no assurance is given that any competing architect will be awarded the work, the identity of competitors is not concealed, there is no provision for expert advice in judging the drawings, and the competitors are made pecuniarily responsible for the cost of the buildings, though they are not allowed any control of conditions and do not themselves obtain the bids by which the cost is to be ascertained.

The other objectionable points are of relatively minor importance and could be conceded by architects without



PAVILION AT WORLD'S FAIR, ST. LOUIS.
Exhibit of the Hydraulic Press Brick Company.

serious compromise, though they are far from satisfactory, — as the calling for a bond from the successful competitors, and the reservation by the Board of the right to change the plans without proviso for correspondingly changing the established price. The resolutions include



DETAIL OF HOUSE, ST. LOUIS, MO.
Barnett, Haynes & Barnett, Architects.
Terra-cotta made by Winkle Terra-Cotta Company.

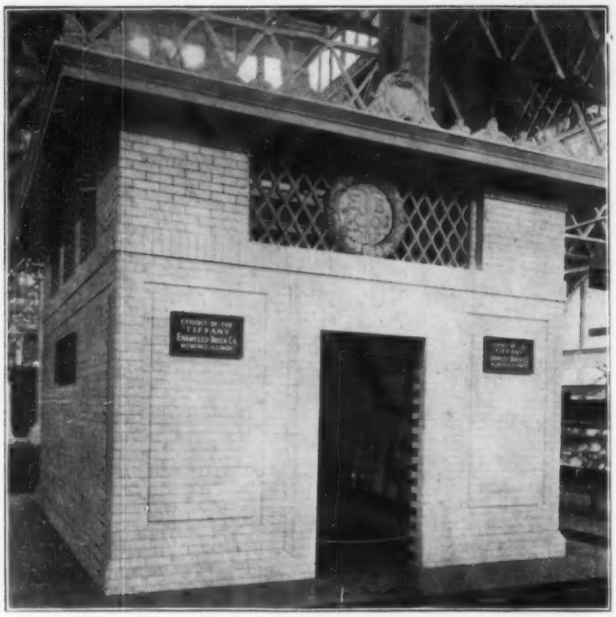
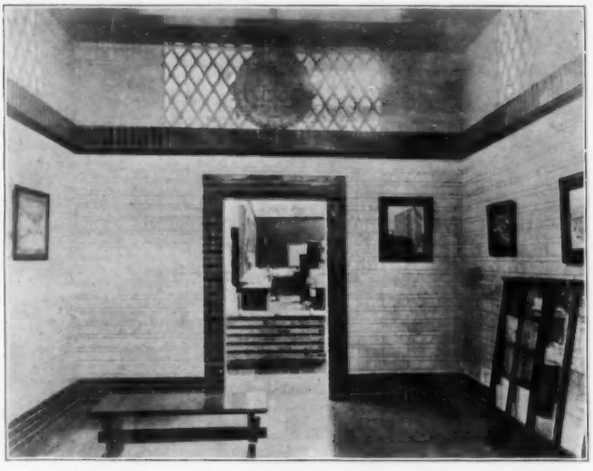


EXHIBIT OF THE TIFFANY ENAMELED BRICK COMPANY AT WORLD'S FAIR, ST. LOUIS.
Mauran, Russell & Garden, Architects.
Satin finish light mottled blue and buff shades used.

choice of an architect, and it accordingly makes the competitor's task unnecessarily hard, while it binds itself to nothing at all. The whole burden is upon the architect. At the same time, the imposed conditions are fairer than many which we have seen nearer home than San Francisco, and it would seem as though there ought to be some way by which the requirements could be modified to meet the very reasonable objections of the

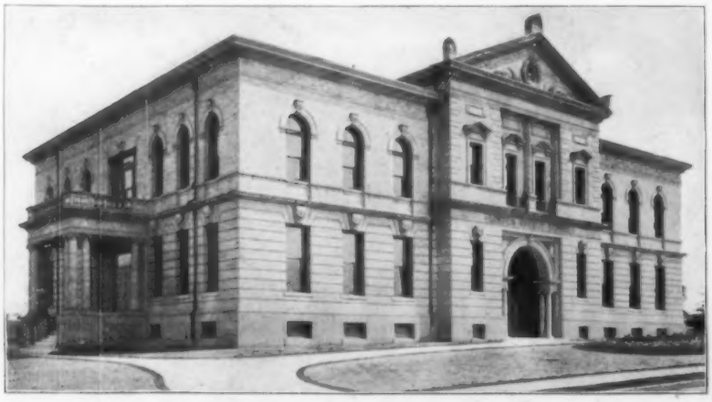
DETAIL BY L. C. HOLDEN, ARCHITECT.
EXCELSIOR TERRA-COTTA COMPANY, MAKERS.



INTERIOR OF PAVILION BUILT OF TIFFANY ENAMELED BRICK AT ST. LOUIS FAIR, DARK GREEN AND BUFF SHADES USED.

a request to the Board that the program be modified to conform with the code for competitions of the American Institute of Architects, and the services of a member or members of the Chapter are tendered, free of charge, to aid and advise the Board in formulating a program in conformity with the customary and usual practice of the profession.

We fully appreciate the position of both the Board and of the Chapter. In the notice there is no indication that the Board means to be unfair to the architects from its standpoint, or that it is actuated by any other motive than a desire to obtain the best results for the city. It evidently has the mistaken idea that a competition can be depended upon for the choice of plans rather than for the Chapter. Unfortunately few laymen appreciate the professional point of view unless they have had personal relations with architects of high standing. The protest voiced by the Chapter is not actuated by spleen or any clan feeling, but is based on the experience of the profession all over the country, and it is to be hoped that two such reasonable bodies as the Board and the Chapter are shown to be by their printed utterances may be able to meet on common grounds, adjust the manifestly inexpedient conditions, and select an architect in a competition which would be a credit to all concerned.

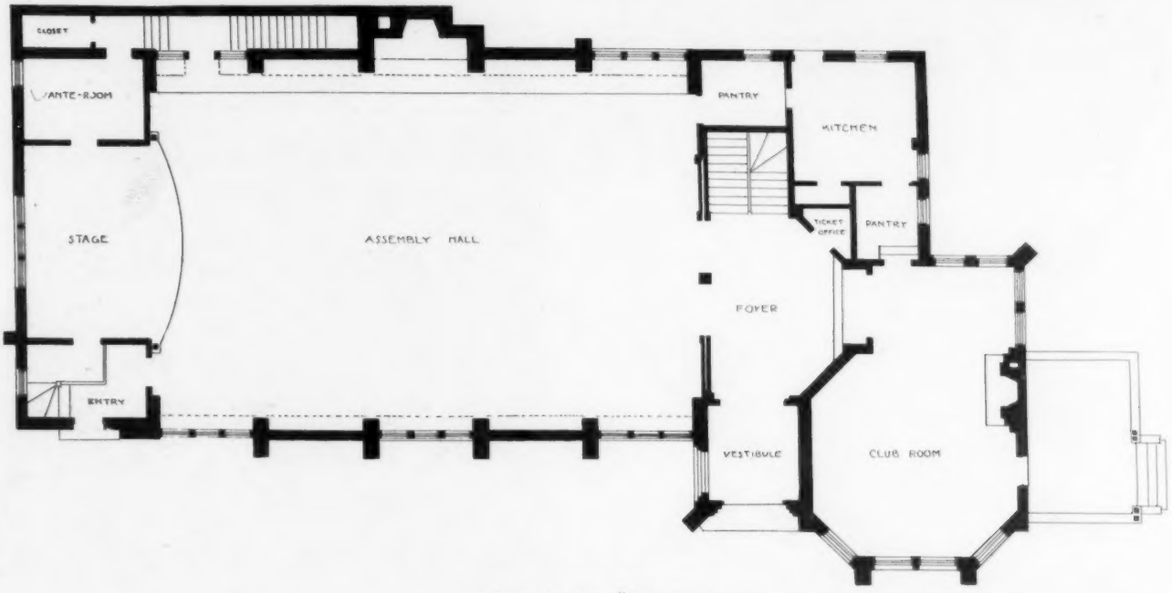


LINDEN AVENUE SCHOOL, PITTSBURGH, PA.
Ellsworth Dean, Architect.
Fireproofed with Johnson System Long-Span Construction.
National Fireproofing Company, Contractors.

THE CLEVELAND BUILDING CODE.

THE city of Cleveland has just passed an entirely new building code, which in some respects is the most complete and com-

"THE HALL."



FIRST FLOOR PLAN, "THE HALL."

HOOK AND LADDER HOUSE.

"THE HALL" AND HOOK AND LADDER HOUSE, WYOMING, N. Y.

POND & POND, ARCHITECTS.

JERSEY CITY TRUST COMPANY BUILDING.
Mowbray & Uffinger, Architects.
Built of Gray Roman Brick made by Kreischer Brick Manufacturing Company.

prehensive that has ever been put forth in behalf of any municipality; indeed, we are inclined to question a little whether it is not too complete and whether, because of going so thoroughly into the most minute details and covering so many points which would ordinarily be matters of contract and specification rather than of code, the new law may not prove too cumbersome and inflexible to meet the varied demands of building operations in a large city. This would be almost our only criticism of the law. It has evidently been prepared by experts and does not show any of the indications of the vicious tampering which so often destroys the efficiency of our municipal building laws. The new code is manifestly the product of engineering skill rather than of political influence.

The code is organically well conceived, though not yet entirely finished. The portions now put forth include Part 2, Buildings and Structures; Part 3, The Occupancy of Public Property; Part 4, Fire Protection; and Part 5, Elevators. The remaining four portions, having to do respectively with Organization and Administration, Plumbing, Electricity, and Smoke Abatement and Boilers, are in course of preparation.

As would be expected, the ordinance contains a number of provisions which are not found in the older codes. It stipulates that bricks to be used in buildings shall be of such quality that in the ordinary course of handling they shall not break up into more than five per cent of bats, a very wise precaution, but which we have never before seen in a building ordinance. The law also makes a new definition, designating "cement mortar" as being

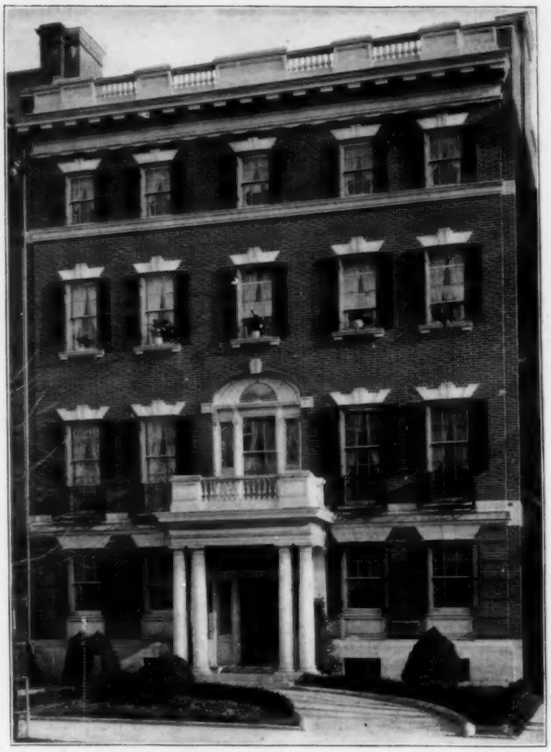
ENTRANCE CITIZENS' NATIONAL BANK, EAST LIVERPOOL, OHIO.
J. E. Allison, Architect.
Terra-Cotta made by Indianapolis Terra-Cotta Company.

FAIENCE TILE USED IN NEW YORK SUBWAY.
Grueby Faience Company, Makers.

a mixture in equal parts of lime, Portland cement and sand, restricting the words "Portland cement mortar" to a mixture of pure cement and sand. This definition we believe to be somewhat misleading.

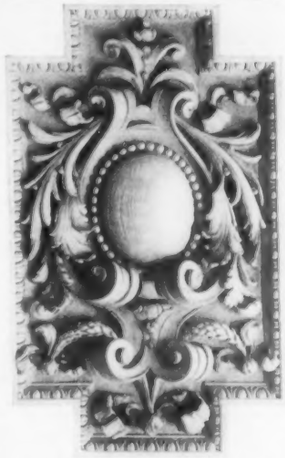
The law carefully specifies how concrete shall be mixed, providing that the cement and sand shall be first made into a mortar and then incorporated with the crushed stone. We consider this a mistaken view. We have repeatedly watched attempts to make good concrete in this way, and we believe the more common plan of mixing the three ingredients dry and then turning them over wet produces better results. This is one of the many cases in which the new law apparently does not allow any latitude whatever and leaves nothing to the discretion of either contractor or supervisor.

All structural material is required to be tested before its use will be approved. This is following somewhat in the line of the New York law, and is a wise or unwise proviso depending upon the experience and honesty of the individuals who will have to pass upon the results of tests. It has by no means worked always to advantage in New York. Furthermore, the law is very sparing in unit stresses, but is very exact in specifying the factors



HOUSE AT WASHINGTON, D. C.
Marsh & Peter, Architects.
Built of Sayre & Fisher Company's Repressed Red Brick.

of safety. Herein it is radically different from the Boston building law, and there is a chance for a good deal of difference of opinion and of serious trouble in the application. Our knowledge of steel and wood, to say nothing of other materials, is not yet sufficiently exact to enable us to define limits of ultimate strength, and we believe the Boston building law is better in this respect in that it avoids any controversy of the sort by specifically stating unit stresses. Terra-cotta blocks, by which is meant architectural terra-cotta for the exterior of buildings, is restricted by the Cleveland code to unit loads of five tons per foot unfilled or eight tons per foot filled, which is practically the same as the unit loads for hard brick laid up in lime mortar. Clay blocks or tiles, by which is meant the ordinary interior partition blocks, are limited to a safe crushing resistance of 5,760 pounds per foot for porous material, 8,640 pounds for ordinary hard material and 11,520 pounds for hard fire-clay blocks. This latter amount is a trifle more than the load allowed on unfilled terra-cotta blocks.



DETAIL BY W. E. PARFITT, ARCHITECT.
New York Architectural Terra-Cotta Company, Makers.

The matter of unit floor loads is specified to an extent unusual in building laws, and these loads are scaled down considerably below the New York and Boston laws, and, indeed, below the ordinances of most of our cities. Thus, schoolrooms, assembly halls and theater auditoriums call for only eighty pounds per foot; offices are passed at sixty, and the halls of office buildings at one hundred, while hotels and tenement houses are considered safe at fifty pounds for the rooms and eighty for the corridors. In addition, the law allows these floor loads to be scaled down quite materially for columns and girders. This is a good practice and we believe would receive the commendation of every engineer. The unit loads are certainly far higher than the actual loads which ever occur. The law, however, does not go far enough in attempting the scaling down of the floor loads for the foundations, the maximum reduction being fifty per cent of the live load. Eighty per cent reduction is none too much, and we have known of cases where the live loads have been entirely disregarded in designing the foundations.

FAIENCE MANTEL IN MOTTLED BROWN TILES WITH WATER-TIGHT WINDOW FLOWER TROUGH TO MATCH. OPENING LEFT IN MANTEL FOR MIRROR.
E. R. Liebert, Architect.
Hartford Faience Company, Makers.

The section relating to Fireproofing is very comprehensive, and from the standpoint of THE BRICKBUILDER is quite satisfactory. A number of materials are absolutely prohibited for fireproofing purposes, including plaster of Paris, sulphate of lime and cinders or other similar material which would be combustible at 1500 degrees. The accepted materials are stated in the code in the following order: Brick, porous terra-cotta, semi-porous terra-cotta, dense terra-cotta, concrete and plastering on metal lath.

All fireproofing is required to be at least two inches thick and for column casings there

DETAIL FOR CHURCH, JOHN T. COMES, ARCHITECT.
Atlantic Terra-Cotta Company, Makers.

must be two two-inch casings thoroughly secured in place. The constructive restrictions throughout are quite abreast with the most advanced knowledge upon the subject and are fairly the embodiment of the best practice throughout the country.

The law is unreservedly a good one: whether, in application, it will be found cumbersome remains to be seen. It certainly will call for pretty thorough knowledge on the part of the supervisors and of the architects to comply with all its regulations.

IN GENERAL.

A partnership for the practice of architecture has been formed between Wm. C. Brocklesby of Hartford, Conn., and H. Hilliard Smith. Offices in the Connecticut Mutual Building, 36 Pearl Street, Hartford, Conn.

That some large work is in progress is attested by the fact that Fredenburg & Lounsbury of New York have closed, within a few days, three large contracts; one of 400,000 Harvards for the Dormitory of Columbia University, another of 200,000 Harvards for the Cottage

DETAILS BY GEORGE B. POST, ARCHITECT.
Perth Amboy Terra-Cotta Company, Makers.

Club at Princeton University, for both of which McKim, Mead & White are the architects; and an order of 200,000 enameled brick for the towers of the Blackwell's Island Bridge.

The Tiffany Enameled Brick Company reports a steady growth in the demand for their satin finish brick for fronts of office, bank, library, residence and apartment buildings and a larger use of their second quality brick for swimming pools, light courts, elevator shafts, gymnasiums, schools, engine and boiler rooms.

Their bricks are being used in the following new buildings:

First National Bank, General Henry Strong's Office Building, Ryerson Office Building, Chicago & Northwestern Railway Office Building, South Park Toilet Building, Chicago; Illinois Steel Company's Power House at South Chicago, Ill.; Abattoir for New York Butchers Dressed Meat Company at New York City; Keys Building, Central Trust Building, Harrison Building, Cincinnati, Ohio; Security Trust & Savings Vault Company's Building and Lexington City National Bank at Lexington, Ky.; Elgin National Watch Company Factory, Elgin, Ill.; Natatorium Swimming Pool at Reading, Pa.; Schoolhouse at Webster, Mass.; Somerville Fire Station, Boston, Mass.; Reibold Building at Dayton, Ohio; Atlanta Terminal Depot, Atlanta, Ga.; Sims Library, Waxahachie, Tex.; United States Mint and Evans School at Denver, Colo.; General William J. Palmer's residence, Glen Eyrie, Colorado Springs, Colo.; Quincy School, LaFayette School and Manual Training High School at Topeka, Kan.; State Normal School, Cedar Falls, Iowa; Grant County Jail, Marion, Ind.; and Laundry Building, Soldiers' Home, Danville, Ill.

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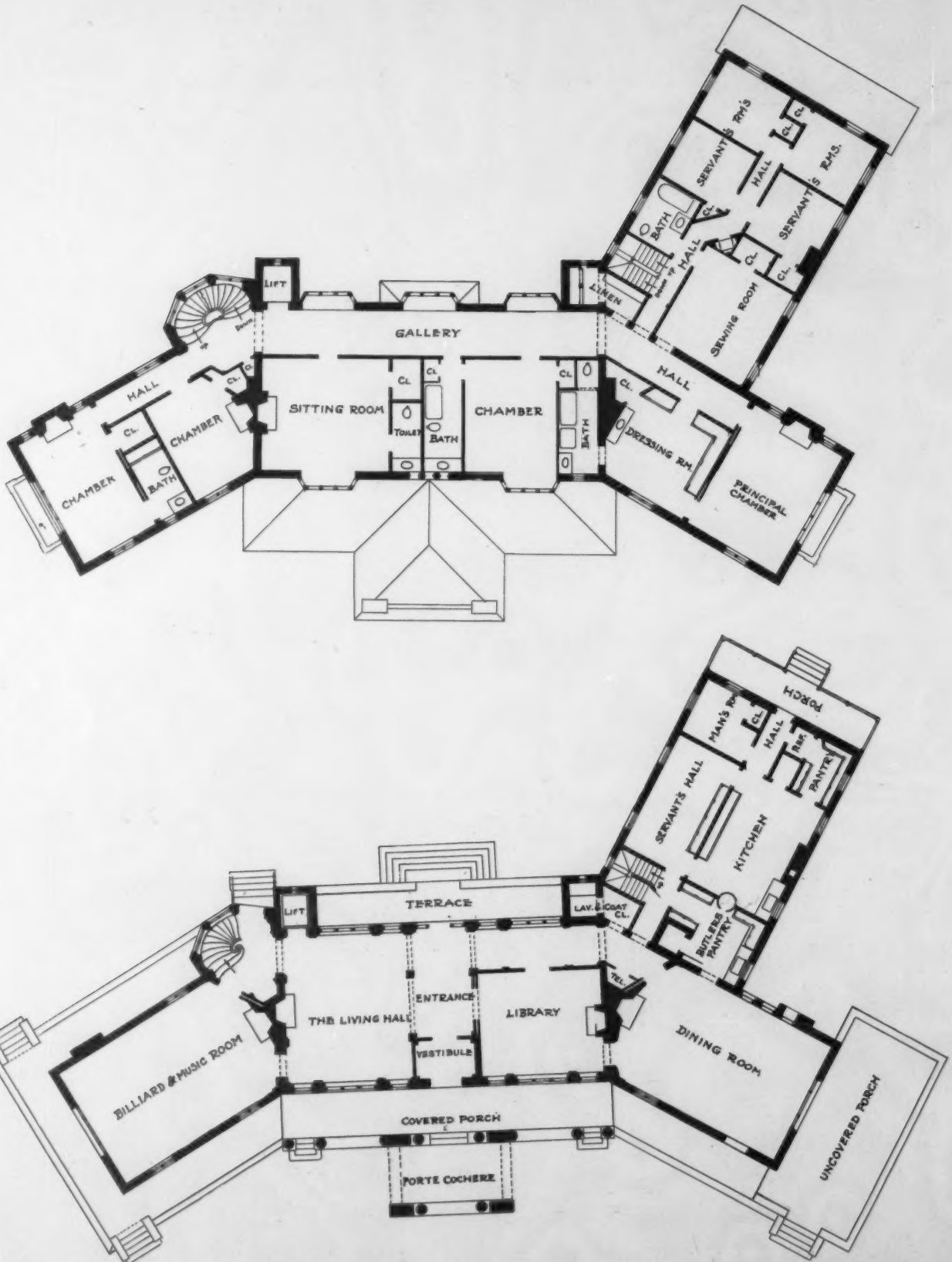
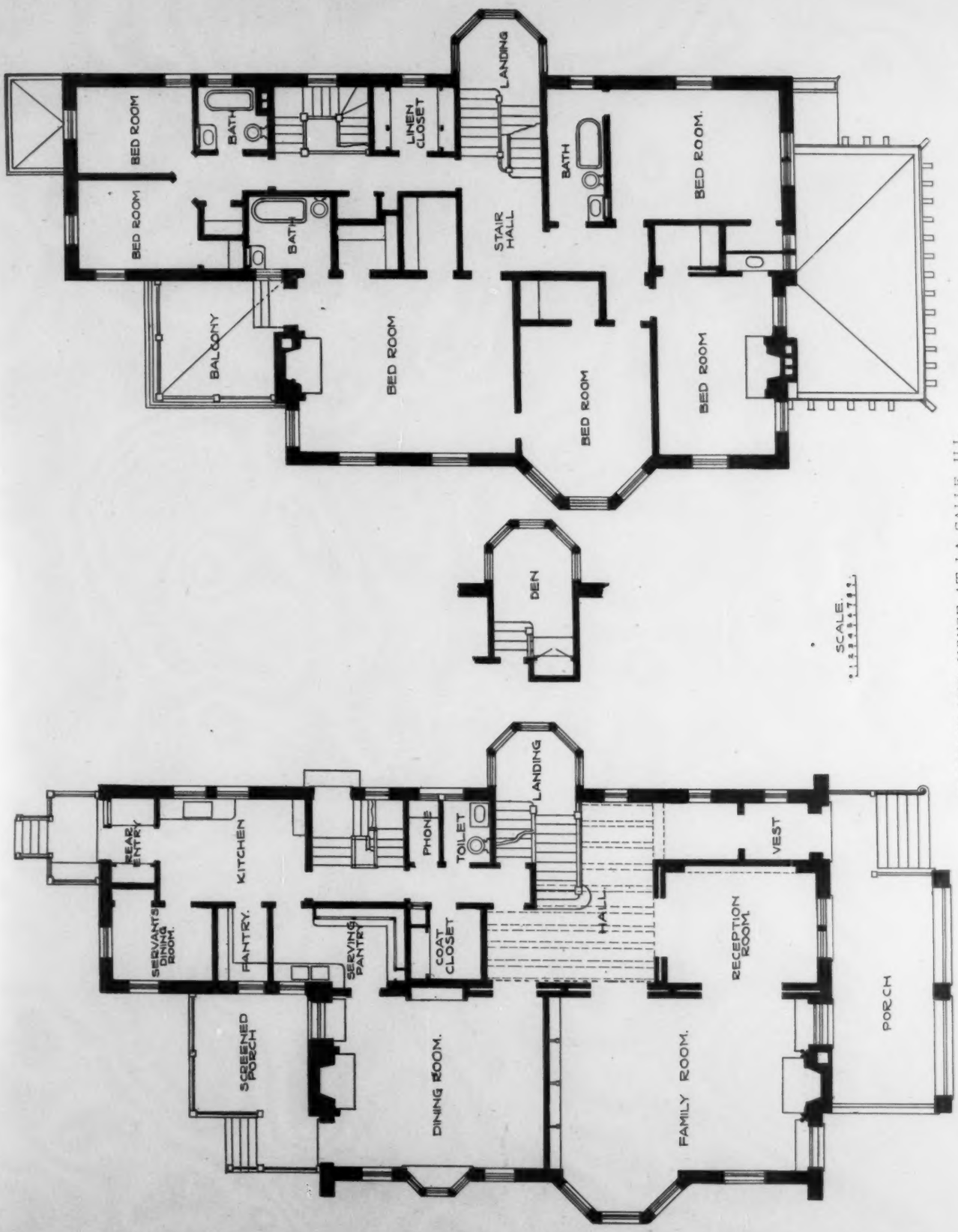


FLOOR PLANS, HOUSE AT PLAINFIELD, N. J.

TRACY & SWARTWOUT, ARCHITECTS.

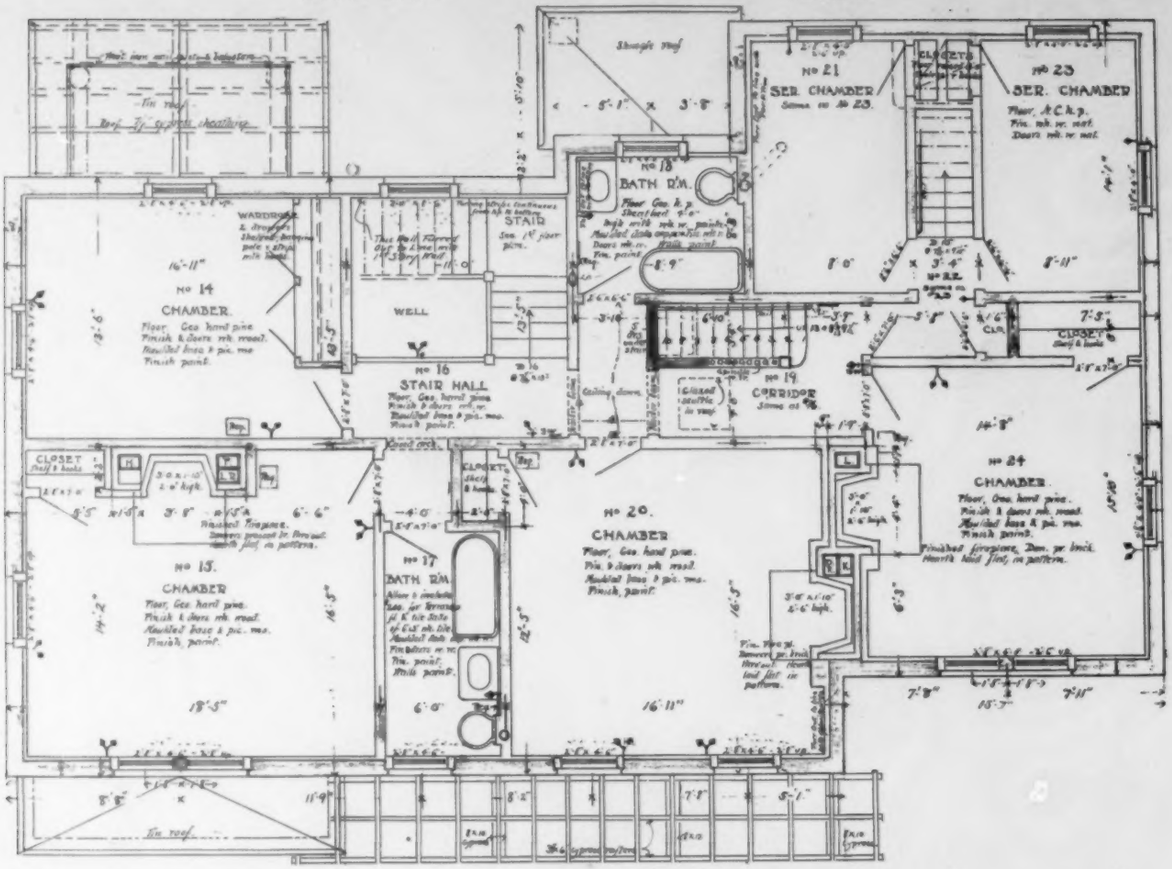
UNIV OF MI



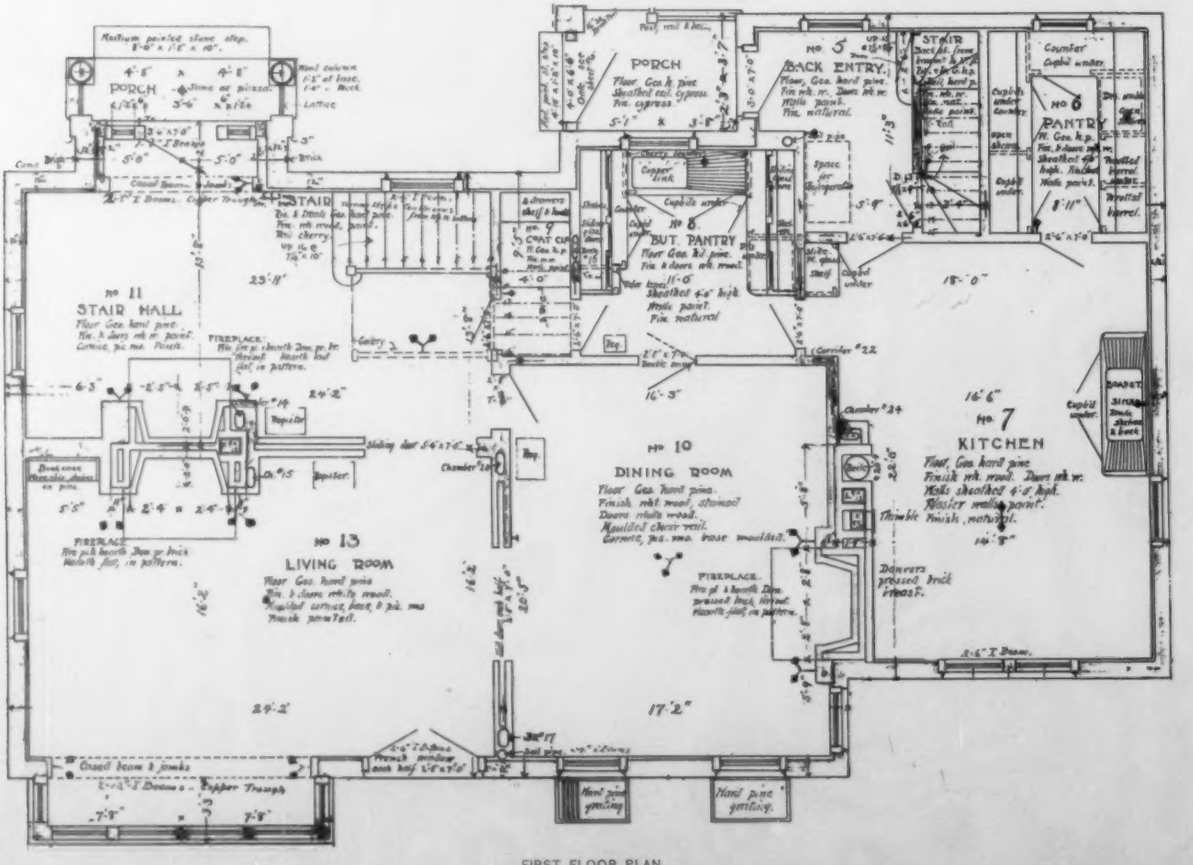
FLOOR PLANS HOUSE AT LA SALLE, ILL.

POND & POND, ARCHITECTS.

UNIV. OF MICH.



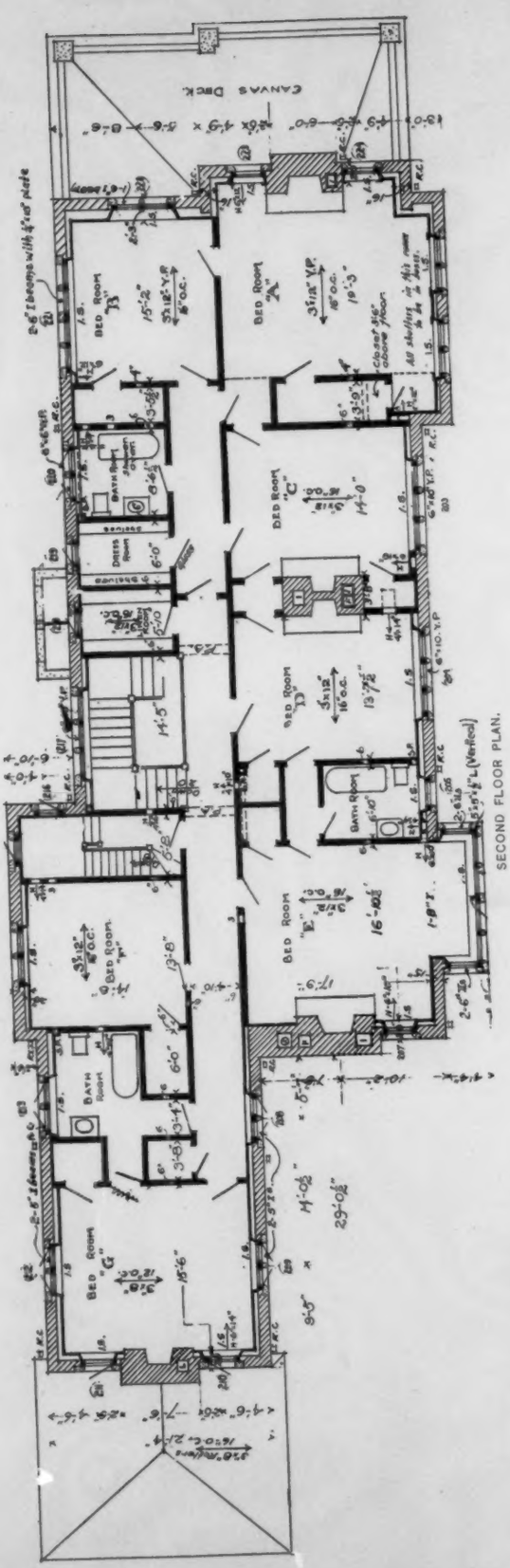
SECOND FLOOR PLAN.



FIRST FLOOR PLAN.

FLOOR PLANS, HOUSE AT BROOKLINE, MASS.

WILLIAM G. RANTOUL, ARCHITECT.



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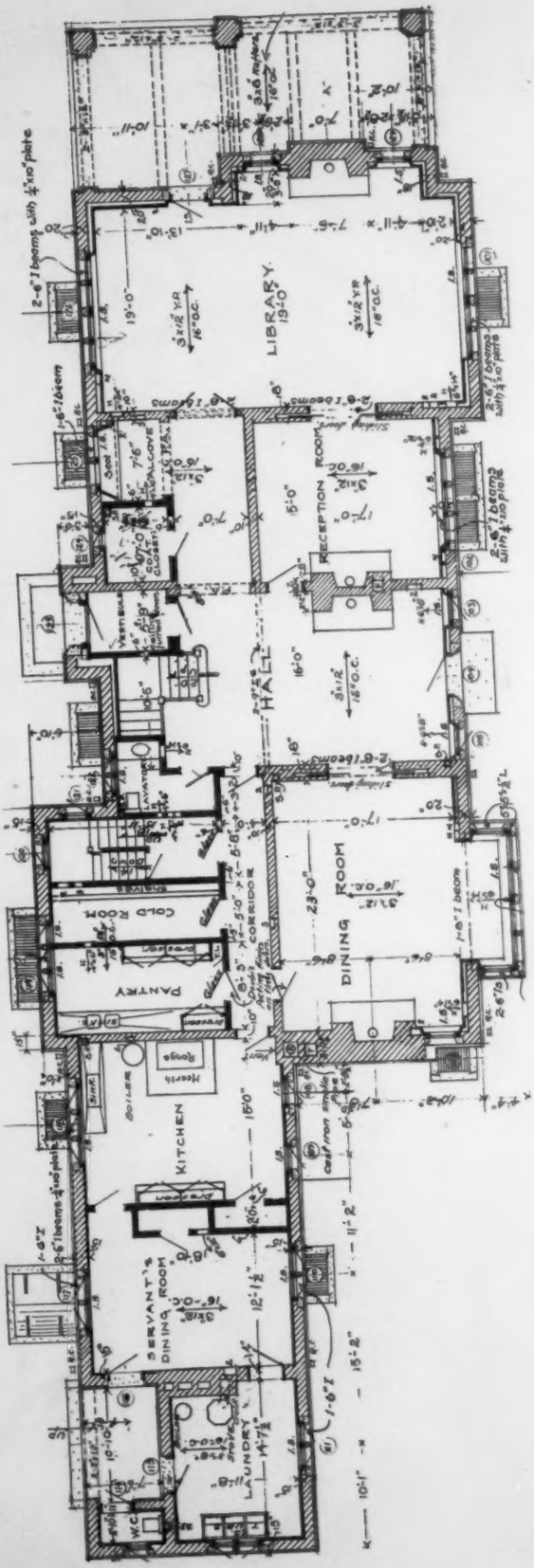


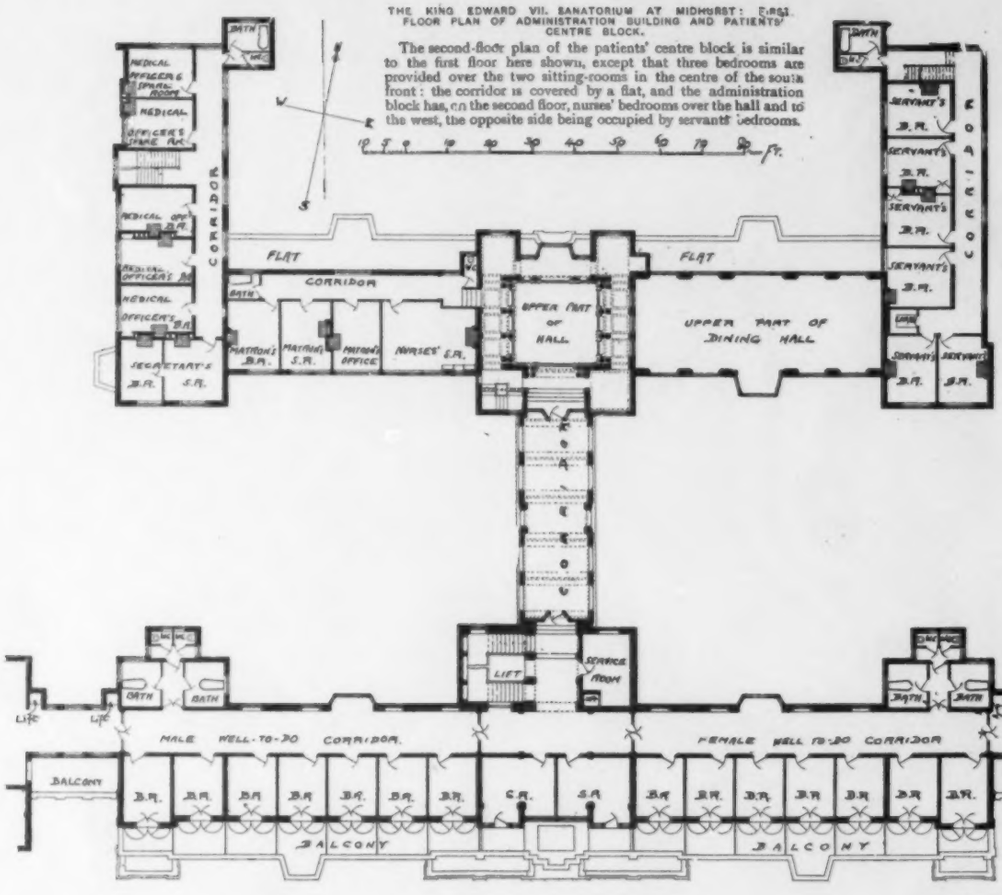
FIRST FLOOR PLAN.

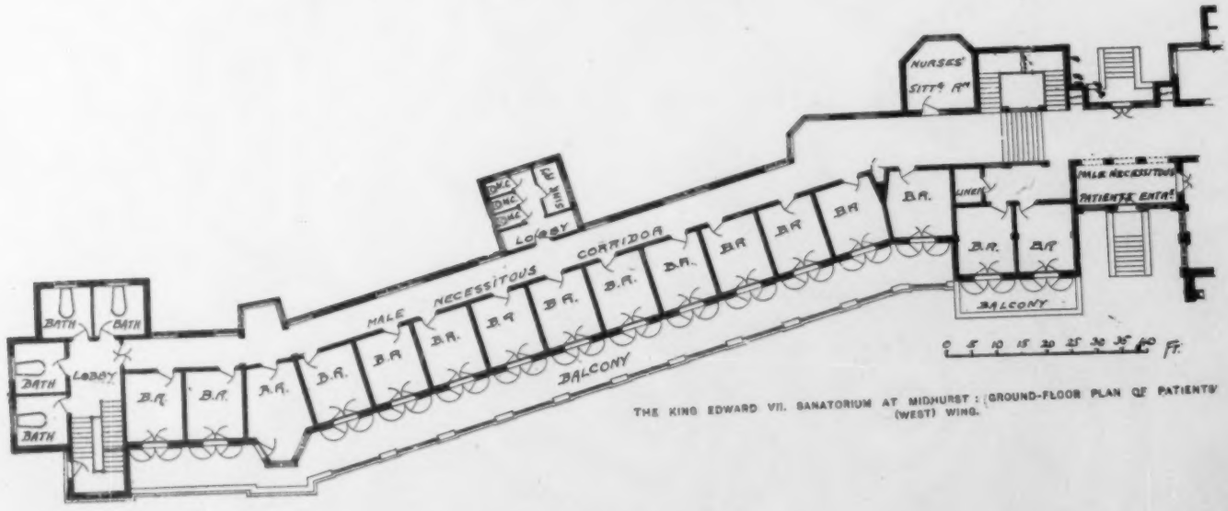
FLOOR PLANS, HOUSE AT CHESTNUT HILL, PA.

COPE & STEWARDSON, ARCHITECTS.

THE KING EDWARD VII. SANATORIUM AT MIDHURST: FIRST FLOOR PLAN OF ADMINISTRATION BUILDING AND PATIENTS' CENTRE BLOCK.

The second-floor plan of the patients' centre block is similar to the first floor here shown, except that three bedrooms are provided over the two sitting-rooms in the centre of the south front: the corridor is covered by a flat, and the administration block has, on the second floor, nurses' bedrooms over the hall and to the west, the opposite side being occupied by servants' bedrooms.



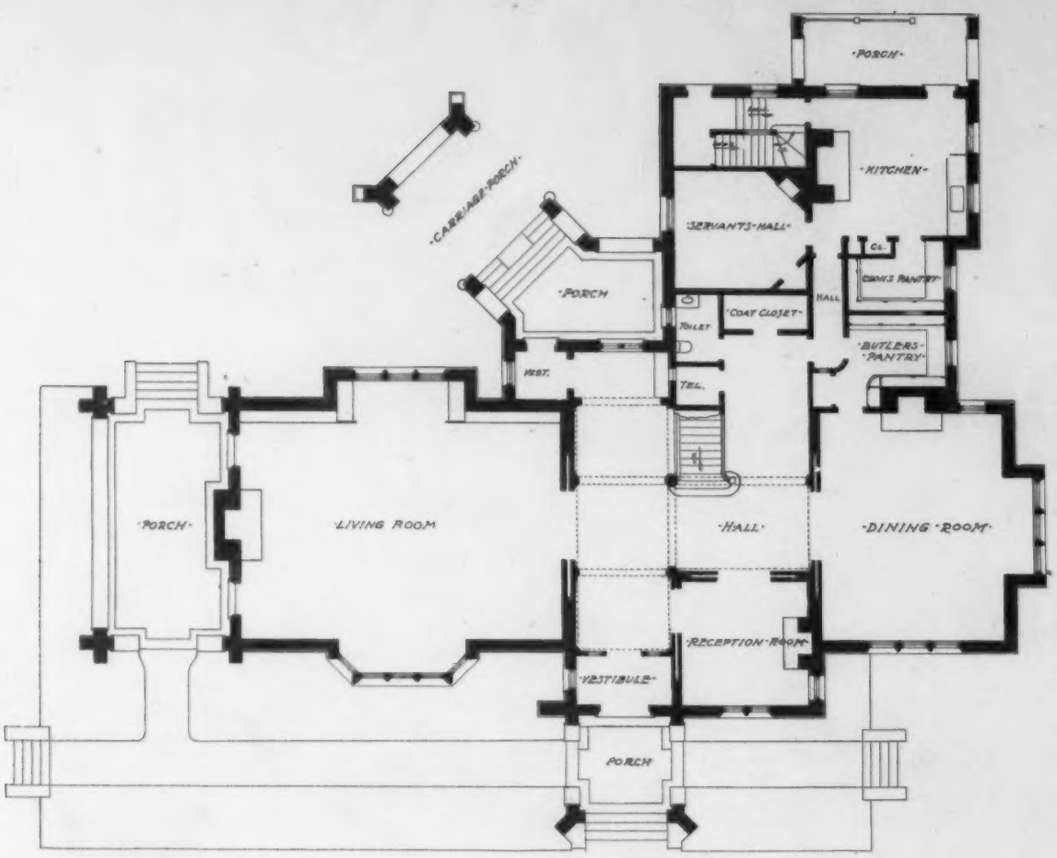


THE KING EDWARD VII. SANATORIUM AT MIDHURST: GROUND-FLOOR PLAN OF PATIENTS' (WEST) WING.

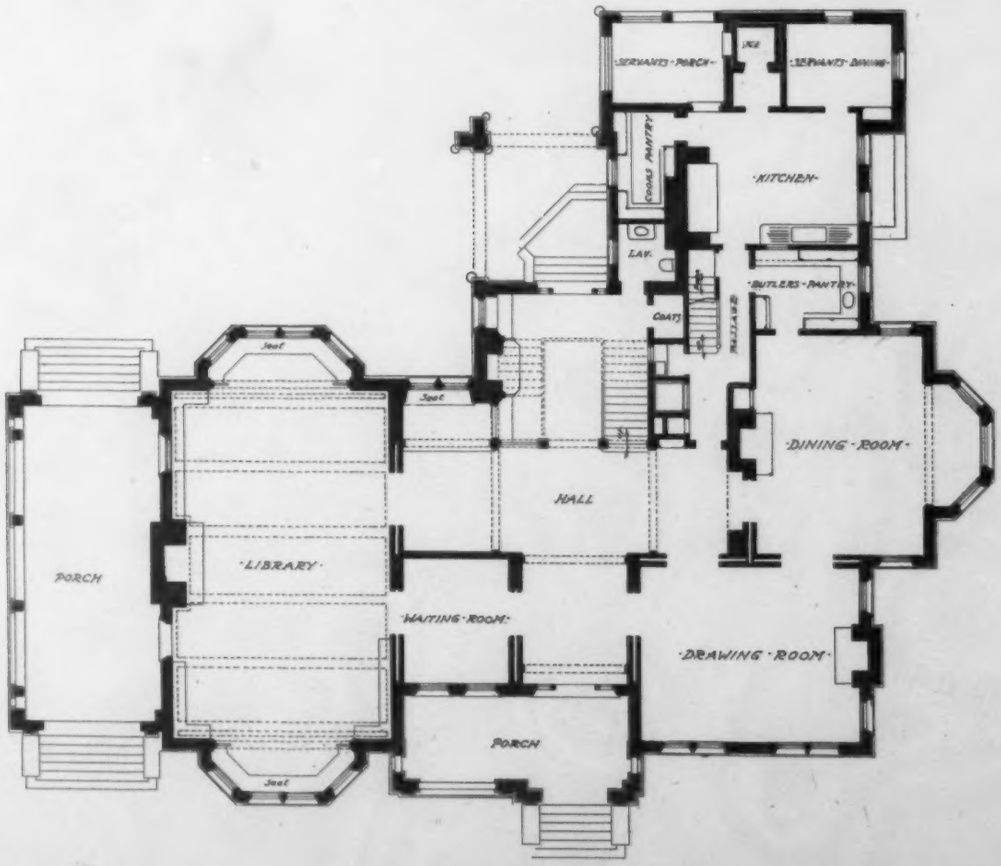
GROUND FLOOR PLAN, WEST WING.

THE KING EDWARD VII. SANATORIUM, MIDHURST, ENGLAND.

H. PERCY ADAMS, ARCHITECT.



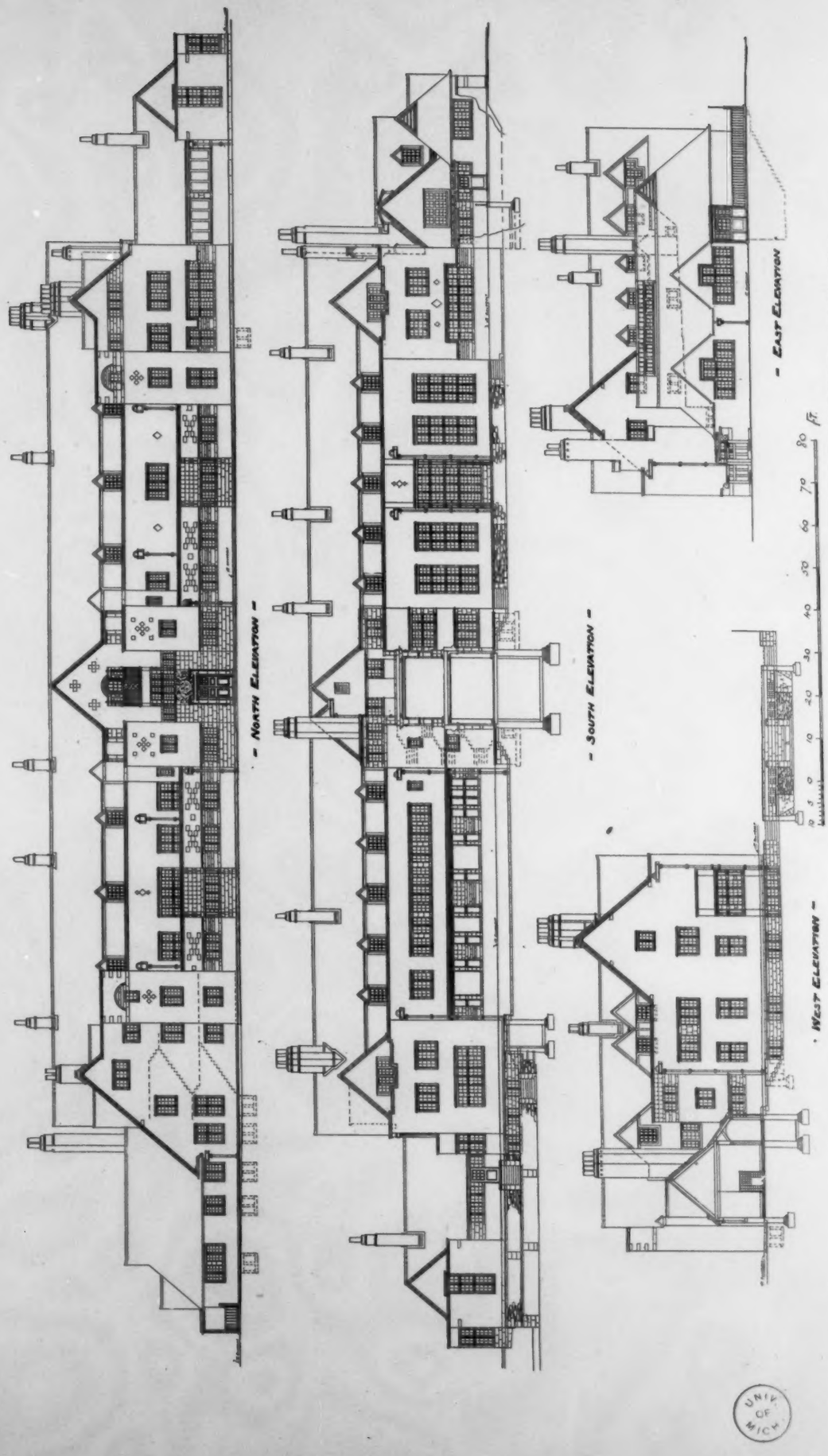
FIRST FLOOR PLAN.



FIRST FLOOR PLAN.

FIRST FLOOR PLANS, TWO HOUSES AT CLEVELAND, OHIO.

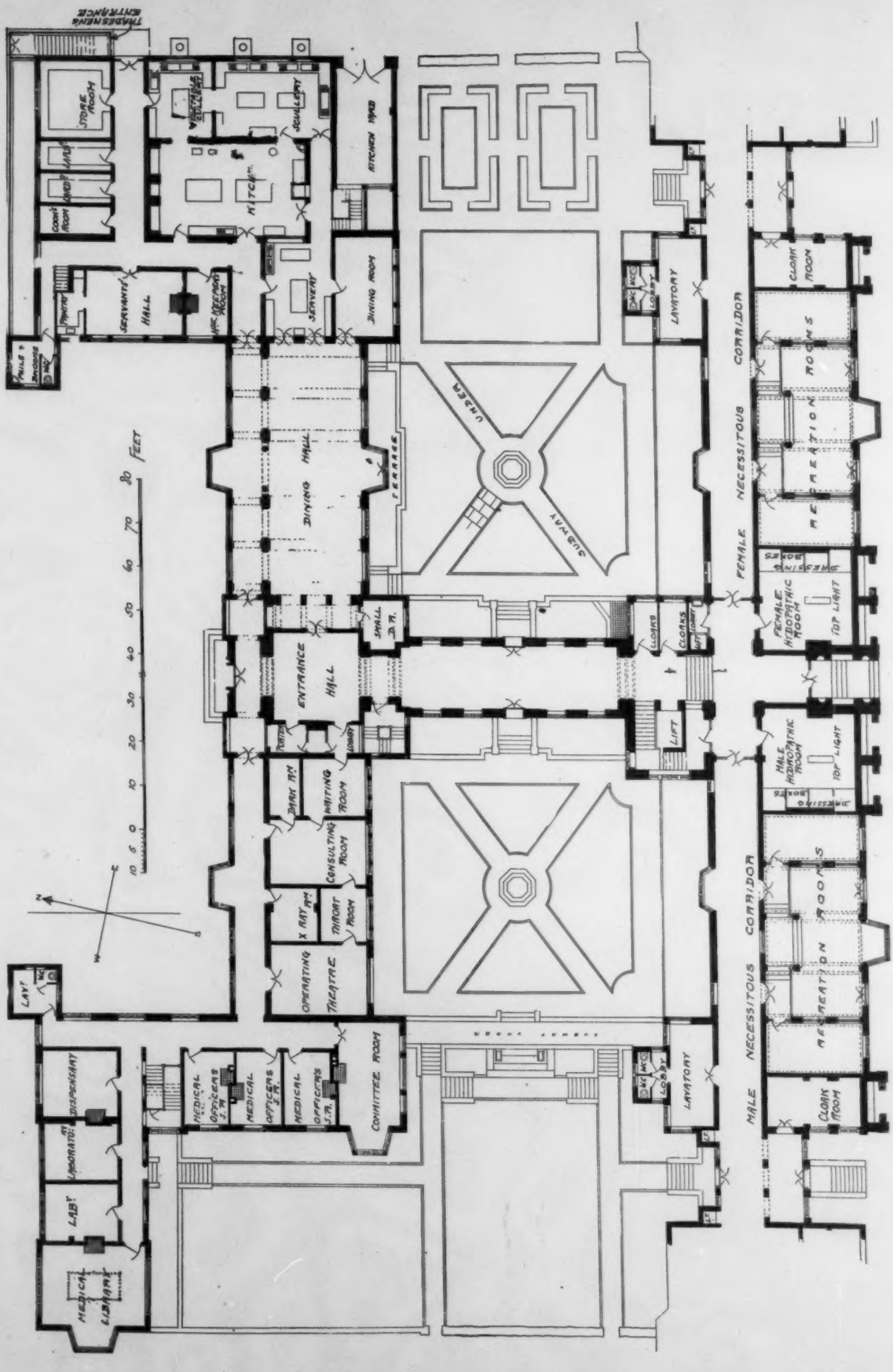
MEADE & GARFIELD, ARCHITECTS.



ADMINISTRATION BUILDING, THE KING EDWARD VII. SANATORIUM AT MIDHURST, ENGLAND.

H. PERCY ADAMS, ARCHITECT.

UNIV. OF MICH.



GROUND FLOOR PLAN OF ADMINISTRATION BUILDING AND PATIENTS' CENTRE BLOCK.

THE KING EDWARD VII. SANATORIUM AT MIDHURST, ENGLAND.

UNIV. OF MICH.

HOUSE AT BROOKLINE, MASS.

WILLIAM G. RANTOUL, ARCHITECT.

UNIV. OF MICH.

HOUSE AT CHESTNUT HILL, PA.

COPE & STEWARDSON, ARCHITECTS.

UNIV. OF WISC.

HOUSE AT LA SALLE, ILL.

POND & POND, ARCHITECTS.

UNIV. OF ILL.

TWO HOUSES AT CLEVELAND, OHIO.

MEADE & GARFIELD, ARCHITECTS.

UNIV OF MICH

HOUSE AT ST. LOUIS, MO.

BARNETT, HAYNES & BARNETT, ARCHITECTS.

UNIV. OF MICH.

HOUSE AT PLAINFIELD, N. J.

TRACY & SWARTWOUT, ARCHITECTS.

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